North Carolina Department of Transportation
Statewide Planning Branch
Small Urban Planning Unit

Thoroughfare Plan for Vance County

October, 1997

THOROUGHFARE PLAN
FOR
VANCE COUNTY, NORTH CAROLINA

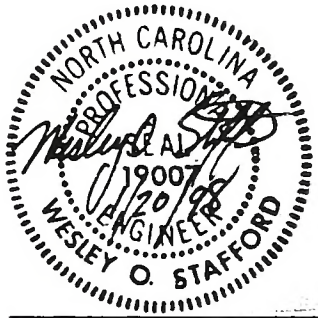
Prepared by the:

Statewide Planning Branch
Division of Highways
North Carolina Department of Transportation

In Cooperation with:

The County of Vance
The Federal Highway Administration
U. S. Department of Transportation

September 10, 1997



Wesley O. Stafford, P.E.
Small Urban Planning Unit Head

Acknowledgments

Persons responsible for this report:

Project Engineers:	Jeff Dale/Wes Stafford, P.E.
Small Urban Planning Unit Head:	Wes Stafford, P.E.
Statewide Planning Branch Manager:	M. R. Poole, Ph.D., P.E.
Engineering Technicians:	Kurt Freitag/Thuan Nguyen

Executive Summary

Thoroughfare Plan Recommendation

The following is a list of thoroughfare plan recommendations for routes in Vance County by functional classification. Detailed descriptions of each of these recommendations, including purpose and need, are included in Chapter 2 of this report.

Other Principal Arterials

The other principal arterial serve primarily substantial statewide or interstate travel. This system consists of all non-Interstate principal arterials.

1. **US 1/158** - Widen section from North Henderson Extraterritorial boundary to Warren County Line **to a 24' wide pavement width**, "K" cross-section, Appendix C.

Minor Arterials

These are the facilities that serve primarily through traffic movements in the County.

2. **NC 39* (South of Henderson)** - Widen section from Franklin County Line to the South Henderson Planning Area Boundary to a **four-lane curb and gutter** cross-section G, Appendix C.

Major Collectors

The rural collector routes serve primarily intra-county travel. The major collectors roads supplement the arterial system by providing an interconnecting network between smaller population centers and the arterial system.

3. **US 158 Business*** - Widen the section from the Granville County Line to the West Henderson Extraterritorial Boundary **to a 24' wide pavement width**, cross-section "K", Appendix C.

4. **NC 39 (North of Henderson)** - Widen section from North Henderson extraterritorial boundary to SR 1356 (Rock Springs Road) to a **24' wide pavement width**, cross-section "K".

5. **US 1 Business*** - It is recommended that US 1 Business be widened from the South Henderson Extraterritorial boundary to US 1 Bypass to a **five-lane curb and gutter cross-section**.

6. **SR 1001 (Warrenton Road)** - It is recommended that the existing 20 foot wide facility be widened from the eastern Henderson extraterritorial boundary to the Warren County line to a 24 foot wide facility to handle future traffic volumes.

7. **SR 1533 (Vicksboro Road)** - Widen the existing 18 foot wide cross-section from East Henderson extraterritorial boundary to Warren County Line to a 24 foot wide cross-section.

8. **SR 1369 (Jackson Town Road)** -. It is recommended that the exiting 18 foot wide section be widen between I-85 and the Warren County Line to a 24 foot wide cross-section.

9. **SR 1303 (Hicksboro Road)** - This facility serves western Vance County from Hicks Cross roads to SR 1326 (Kelly Road) just north of Henderson. The existing cross-section is 18 feet wide and the volume is

600 vpd. The future year volume is expected to be 1,900 vpd. It is recommended that the section from SR 1326 (Kelly Road) to SR 1336 (Stovall Road) be widened to a 24 foot wide facility.

Minor Collectors

Rural Minor Collector collects traffic from local roads and bring all developed areas within a reasonable distance of a collector road.

10. **SR 1304 (Dabney Road)** -. It is recommended that SR 1304 be widen from the Granville County Line to the Henderson western extraterritorial boundary to a 24 foot wide facility for safety.

11. **SR 1308 (Glebe Road/Nutbush Road)** - It is recommended that this facility be widen from SR 1304 (Dabney Road) to SR 1319 (Satterwhite Point Road) to a 24 foot wide facility for safety.

12. **SR 1374 (Anderson Creek Road)** - It is recommended that it be widened from SR 1319 (Satterwhite Point Road) to SR 1371 (Flemingtown Road) to a 24 foot, cross-section "K", Appendix C.

13. **SR 1400 (Jackson Royster/Jackson Road)** - It is recommended that it be widened from SR 1371 (Flemingtown Road) to SR 1369 (Jacksontown Road) to a 24 foot , cross-section "K", Appendix C.

14. **SR 1371 (Fleming Town Road)** - It is recommended that it be widened from 18 feet to 24 feet wide, cross-section "K", Appendix C, as a safety improvement.

15. **SR 1518 (Newton Dairy Road/Stewart Farm Road)** - It is recommended SR 1518 be widened to 24 feet, cross-section "K", Appendix C.

16. **SR 1519 (Gillburg Road/Cary Chapel Road/Rock Mill Road)** - It is recommended that this facility be widened to 24 feet, cross-section "K", Appendix C.

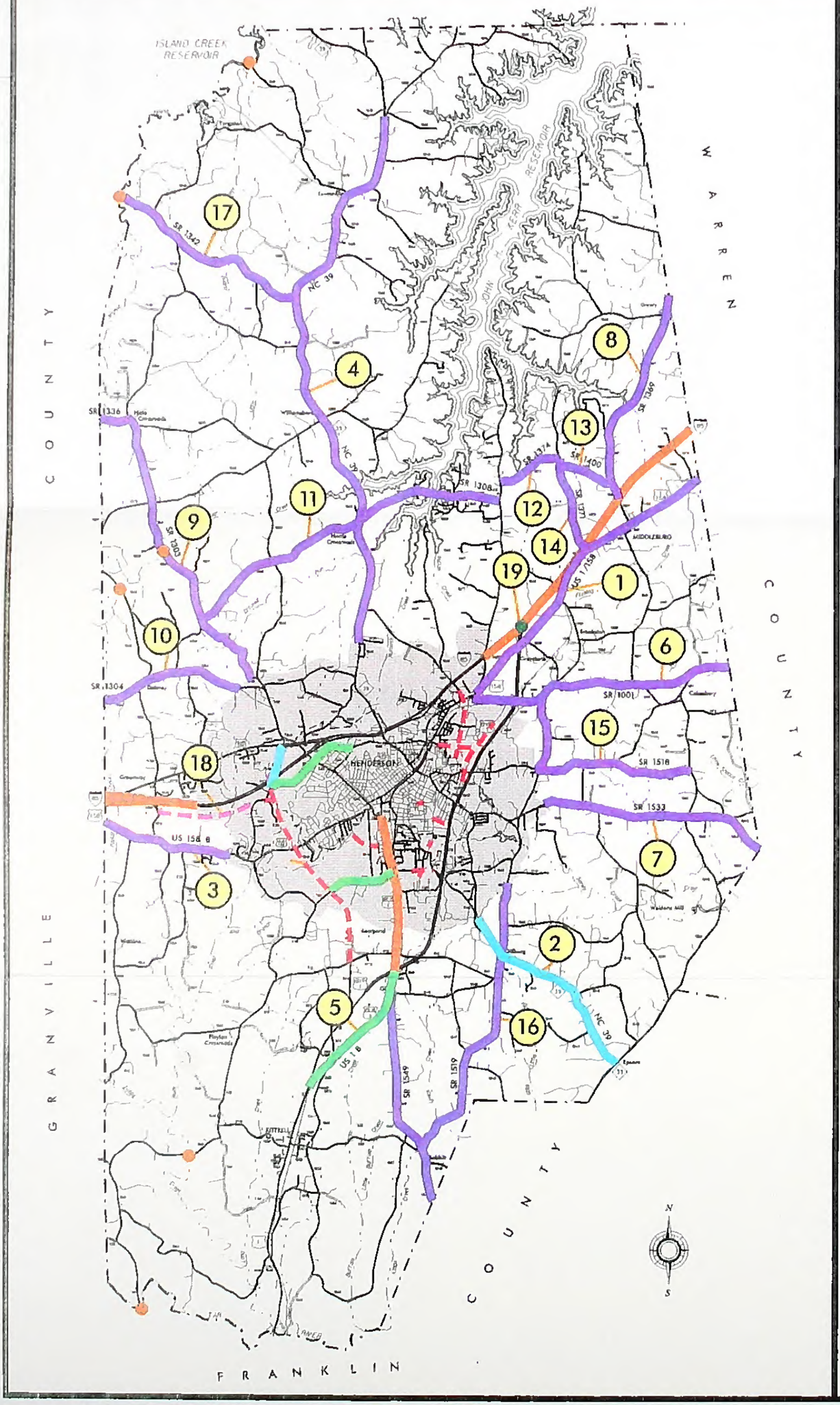
17. **SR 1342 (Morgan Road)** - It is recommended that this facility be widened to 24 feet, cross-section "K", Appendix C.

New Location Projects

18. New TIP project from SR 1126 (Popular Creek Road) to SR 1128 (Ruin Creek Road). Construct a two lane service road on new location.

System Deficiencies

19. **US 1 / I-85 Interchange** - US 1 Bypass provides for north - south through traffic along the east side of Henderson. The existing interchange at I-85 does not accommodate for south-bound I-85 traffic from US 1 Bypass. Similarly there is no ramp for north-bound traffic on I-85 to travel south on US 1 Bypass. This interchange needs to be redesigned so that it will accommodate all turning movements.



Recommendations for Roadway Improvements

- Current TIP Projects
- TIP Bridge Projects
- New TIP Projects
- New TIP Interchonge Projects
- Proposed Interchange Improvement
- Recommended Cross-Section "C" (5 lane curb & gutter)
- Recommended Cross-Section "K" (24' wide)
- Recommended Cross-Section "G" (4 lane curb & gutter)
- Henderson Thoroughfare Plon New Facility
- Henderson ETJ

Vance County
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT
IN COOPERATION WITH THE
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

1 0 1 2 3 4
miles

1 0 1 2 3 4 5
kilometers

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Appendices

Chapter 1

Introduction

Overview

In recent years, Vance County Officials have initiated various projects in an attempt to maintain control on the direction and method of the County's growth. In October of 1996, Vance County completed a Land Use Plan as a way to forecast and direct their development. In order to better understand and hopefully improve their current roadway network, Vance County has organized several residents from across the county to make up the Transportation Advisory Committee (TAC). Soon after its formation, the Transportation Advisory Committee approached Vance County about the importance of a thoroughfare plan from NCDOT. With NCDOT's assistance, Vance County is taking their first step towards improving their existing transportation system.

The objective of thoroughfare planning is to enable the transportation network to be progressively developed to adequately meet the transportation needs of a community or region as land develops and traffic volumes increase. By not planning now for our future transportation needs, unnecessary costs to the physical, social, and economic environment may very well be incurred. Thoroughfare planning is a tool that can be used by local officials to plan for future transportation needs, while at the same time reducing the costs to our environment.

The primary purpose of this report is to present the findings and recommendations of the thoroughfare plan study conducted for the Vance County. The secondary purpose of this report is to document the basic thoroughfare planning principles and procedures used in developing these recommendations. This report can be divided into three parts. The first part of the report, covered in Chapter 1, covers the highlights of the study. Chapter 2 and 3 provide a detailed description of the Thoroughfare Plan study recommendations and address different methods by which these recommendations can be implemented. The final chapter, Chapter 4, covers study procedures and findings.

Information that will be especially useful to the practitioners is provided in the Appendix. The principles of thoroughfare planning are covered in Appendix A, a detailed tabulation of all routes on the Thoroughfare Plan and a graphical representation of typical cross-sections can be found in Appendix B and C respectively. Information related to subdivision ordinances is covered in Appendix D. Finally in Appendix E is an index for secondary road numbers for Vance County.

Background

Vance County, located in north central North Carolina, was originally part of Albemarle County which extended as far west as the Mississippi River. Vance County's land would evolve through Bertie, Edgecombe, Vance, Bute, Warren and Franklin Counties. In 1779, due to the unhappiness cause by the Third Earle of Bute, the Assembly voted that Bute County would be divided into Warren County and Franklin County. Vance County was formed from portions of Franklin County, Warren County and Vance County. It was named for Zebulon Baird Vance who was Governor from 1861 to 1865. The County was founded on the tobacco warehouses of Henderson. Along with Durham and Oxford, Henderson was known as a "Tobacco Town". Today a large part

of the revenue within Vance County still comes from farming as well as from its commercial stores and the abundance of people who visit Vance County for shopping.

Highlights

Major highlights of the 1997 Vance County Thoroughfare Plan are outlined below. The Thoroughfare Plan map is shown in Figure 2. Projects included in the 1997-2003 Transportation Improvement Program (TIP) are shown in parenthesis.

1. **NC 39 South of Henderson** - Widen section from Franklin County Line to the South Henderson Planning Area Boundary to a **four-lane curb and gutter** cross-section ("G" on attached figure). Current volume 4,800 vpd, anticipated 2025 volume 15,600, also ties into recommendation for NC 39 in Henderson planning area of cross-section "G", Appendix C.

2. **US 158 Business** -This facility serves the east side of Henderson and moves traffic east and west between Oxford and Henderson. Widen the section from the Granville County Line to West Henderson Extraterritorial Boundary **to a 24' wide pavement width**, cross-section "K". Currently 2 lanes 20 feet wide, with volume of 3,000 vpd, future volume 2025, is expected to be 8,000 vpd. Recommended to be widened in Henderson Planning area to cross-section "K", Appendix C.

3. **NC 39 North of Henderson** - A major north / south route that serves northern Vance County and Kerr Lake. This facility is heavily traveled with both local traffic and tourist traffic pulling boats in the summer for use on Kerr Lake. Widen section from North Henderson extraterritorial boundary to SR 1356 to a **24' wide pavement width**, cross-section "K". Recommended due to substandard pavement width of 22' and anticipated future volume of 6,500 vpd, currently used by 4,300 vpd.

4. **I-85 and US 1 Interchange Improvements** - US 1 Bypass provides for north - south through traffic along the east side of Henderson. The existing interchange at I-85 does not accommodate for south-bound I-85 traffic from US 1 Bypass. Similarly there is no ramp for north-bound traffic on I-85 to travel south on US 1 Bypass. This interchange needs to be redesigned so that it would accommodate all turning movements.

The North Carolina Department of Transportation and Vance County are jointly responsible for the proposed thoroughfare improvements. Cooperation between the state and the county is of primary concern if the recommendations outlined above are to be successfully implemented. The plan has been mutually adopted by all parties, and it is the responsibility of the County to implement the plan following guidelines set forth in Chapter 3. This plan was adopted by Vance County on September 2, 1997, and by the North Carolina Department of Transportation on October 3, 1997.

It is important to note that the recommended plan is based on anticipated growth within the County as indicated by past trends and future projections. Prior to construction of any of these projects, a more detailed study will be required to revisit development trends and to determine specific locations and design requirements.

GEOGRAPHIC LOCATION FOR VANCE COUNTY NORTH CAROLINA

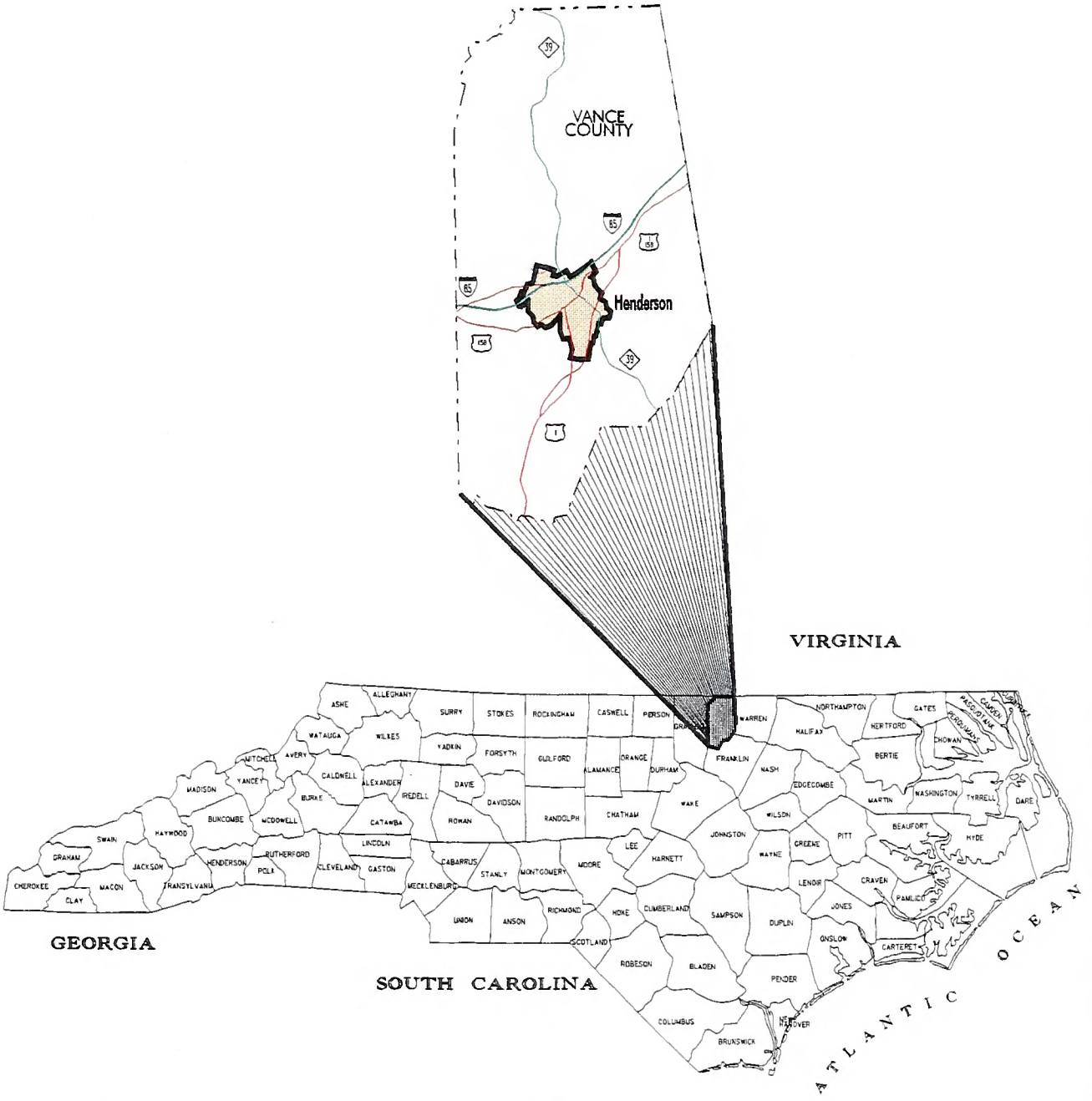


FIGURE 1

Chapter 2

Recommended Thoroughfare Plan

Intent of the Thoroughfare Plan

Transportation is the backbone of a region's economic vitality. Without an adequate transportation system people cannot easily reach their intended destination, goods cannot be delivered to market in a cost effective manner, and investors may look to invest in better served areas. Recent trends such as regional economies, "just in time" delivery, increased automobile ownership, and increased migration away from the central cities and towns are taxing our existing transportation system and requiring that we put more emphasis on planning for our transportation future.

A thoroughfare plan study identifies existing and future deficiencies in the transportation system, as well as uncovers the need for new facilities. The thoroughfare plan also provides a representation of the existing highway system by functional use. This use can be characterized as a part of the arterial street system, the collector street system, or the local street system. A full description of these various systems and their subsystems is given in Appendix A.

This chapter presents the thoroughfare plan recommendations. It is the goal of this study that the recommended plan set forth a transportation system that will serve the anticipated traffic and land development needs of Vance County. The primary objective of this plan is to reduce traffic congestion and improve safety by eliminating both existing and projected deficiencies in the thoroughfare system.

Thoroughfare Plan Recommendation

The process of developing, testing and evaluating alternate plans involved several considerations. These included Vance County's goals and objectives, the identified roadway deficiencies (see Chapter 4), environmental impacts, existing and anticipated land development, and travel services. Aerial photography, topographic mapping, field reconnaissance and discussion with local staff, officials and interested local citizens provided additional basis for identifying and evaluation alternate alignments. The following is a list of recommendations for the interstate, arterial and collector routes in Vance County.

Interstate

I-85 - This is the only interstate facility in Vance County. Currently, the Transportation Improvement Program lists project I-914, pavement rehabilitation and safety improvements, for the section from US 158 (mile post 213.5) in Vance County to the Warren County line. I-85 also is designated as part of the Intrastate System for Vance County, linking US 158 in Granville County with US 158 in Warren County.

Other Principal Arterials

The other principal arterial serve primarily substantial statewide or interstate travel. This system consists of all non-Interstate principal arterials.

US 1/158 - This facility serves the community of Middleburg as well as traffic traveling from northern Henderson to Warren County. Widen section from North Henderson Extraterritorial boundary to Warren County Line **to a 24' wide pavement width**, "K" cross-section. Current cross-section 22' wide, volume 5,500 vehicles per day (vpd), future volume, 8,000 vpd. Safety improvements are recommended for both the horizontal and vertical alignment of US 1/158 in the area of SR 1604 near Middleburg.

US 1 - This facility is the main access route from Raleigh to Henderson, Vance County and I-85. Transportation Improvement Program project R-607 was just completed, widening this facility to multi-lanes.

Minor Arterials

These are the facilities that serve primarily through traffic movements in the County.

NC 39*[1] (South of Henderson) - Widen section from Franklin County Line to the South Henderson Planning Area Boundary to a **four-lane curb and gutter** cross-section "G", Appendix C. Current volume 4,800 vpd, anticipated 2025 volume 15,600, also ties into recommendation for NC 39 in Henderson planning area of cross-section "G".

Major Collectors

The rural collector routes serve primarily intra-county travel. The major collectors roads supplement the arterial system by providing an interconnecting network between smaller population centers and the arterial system.

US 158 Business *- This facility serves the east side of Henderson and moves traffic east and west between Oxford and Henderson. Widen the section from the Granville County Line to West Henderson Extraterritorial Boundary **to a 24' wide pavement width**, cross-section "K", Appendix C. Currently 2 lanes 20 feet wide, with volume of 3,000 vpd, future volume 2025, is expected to be 8,000 vpd. Recommended to be widened in Henderson Planning area to "K".

NC 39 (North of Henderson) - A major north / south route that serves northern Vance County and Kerr Lake. This facility is heavily traveled with both local traffic and tourist traffic pulling boats in the summer for use on Kerr Lake. Widen section from North Henderson extraterritorial boundary to SR 1356 (Rock Springs Road) to a **24' wide pavement width**, cross-section "K". Recommended due to substandard pavement width of 22' and anticipated future volume of 6,500 vpd, currently 4,300 vpd.

US 1 Business* - This facility servers the center of Henderson and Vance County. Currently it carries a high volume of traffic through Henderson. It is recommended that US 1 Business be widened from the South Henderson Extraterritorial boundary to US 1 Bypass to a **five-lane curb and gutter cross-section**. Anticipated future volumes of 7,600 vpd are expected.

---

[1] * Indicates that the project is included in the 1997 - 2003 Transportation Improvement Program

SR 1001 (Warrenton Road) - This facility serves eastern Vance County. It is recommended that the existing 20 foot wide facility be widened from the eastern Henderson extraterritorial boundary to the Warren County line to a 24 foot wide facility to handle future traffic volumes.

SR 1533 (Vicksboro Road) - Ties Warren County to NC 39 in Henderson. This road currently serves 2,400 vpd. The anticipated future volume is 10,000 vpd. Widen the existing 18 foot wide cross-section from East Henderson extraterritorial boundary to the Warren County Line to a 24 foot wide cross-section.

SR 1369 (Jackson Town Road) - This facility serves eastern Vance County and Warren County by providing access to this area from I-85. It is recommended that the exiting 18 foot wide section be widen between I-85 and the Warren County Line to a 24 foot wide cross-section. The current daily traffic volume is 1,100 vpd. The 2025 volume is projected to be 2,000 vpd.

SR 1303 (Hicksboro Road) - This facility serves western Vance County from Hicks Cross roads to SR 1326 (Kelly Road) just north of Henderson. The existing cross-section is 18 feet wide and the volume is 600 vpd. The future year volume is expected to be 1,900 vpd. It is recommended that the section from SR 1326 (Kelly Road) to SR 1336 (Stovall Road) be widened to a 24 foot wide facility.

Minor Collectors

Rural Minor Collector collects traffic from local roads and bring all developed areas within a reasonable distance of a collector road.

SR 1304 (Dabney Road) - This route is a connection from northern Henderson to northern Oxford and passes the Oxford - Henderson Airport in Granville County. The existing cross-section is 18 feet wide with 700 vpd using it. The future year volume is anticipated to be 1,100 vpd. It is recommended that SR 1304 be widen from the Granville County Line to the Henderson western extraterritorial boundary to a 24 foot wide facility for safety.

SR 1308 (Glebe Road/Nutbush Road) - This facility servers as an east-west northern cross county connector from SR 1304 (Dabney Road/Royster Road) to SR 1319 (Satterwhite Point Road). The existing cross-section is 18 feet wide with 500 vpd using the facility. The future year volume is expected to be 1,000 vpd. It is recommended that this facility be widen from SR 1304 (Dabney Road) to SR 1319 (Satterwhite Point Road) to a 24 foot wide facility for safety.

SR 1374 (Anderson Creek Road) - This facility along with SR 1308 (Glebe Road) and SR 1400 (Jackson Road) serves as a east-west northern cross county connector. It is recommended that it be widened from SR 1319 (Satterwhite Point Road) to SR 1371 (Flemingtown Road) to a 24 foot, cross-section "K", Appendix C.

SR 1400 (Jackson Royster/Jackson Road) - This facility along with SR 1308 (Glebe Road) and SR 1374 (Anderson Creek Road) serves as a east-west northern cross county connector that ties into SR 1369 (Jacksontown Road) and I-85. It is recommended that it be widened from SR 1371 (Flemingtown Road) to SR 1369 (Jacksontown Road) to a 24 foot, cross-section "K", Appendix C.

SR 1371 (Fleming Town Road) - This facility provides access to the east-west routes of SR 1374 (Anderson Creek Road) and SR 1400 (Jackson-Royster Road) from US 1/158 on the north east side of Vance County. It is recommended that it be widened from 18 feet to 24 feet wide, cross-section "K", Appendix C, as a safety improvement.

SR 1518 (Newton Dairy Road/Stewart Farm Road) - This facility connects eastern Henderson with eastern Vance County. The existing cross-section is 18 feet wide with 700 vpd using the facility. In the design year the volume is expected to be 2000 vpd. It is recommended SR 1518 be widened to 24 feet, cross-section "K", Appendix C.

SR 1519 (Gillburg Road/Cary Chapel Road/Rock Mill Road) - This is a north / south route that serves central Vance County and eastern Henderson. The existing cross-section is 18 feet wide. It is used by 1,300 vpd. In the design year the volume is expected to be 2000 vpd. It is recommended that this facility be widened to 24 feet, cross-section "K", Appendix C.

SR 1342 (Morgan Road) - This is a northeastern route that serves northern Vance County. The existing cross-section is 18 feet wide. It is used by 800 vpd. In the design year the volume is expected to be 1,300 vpd. It is recommended that this facility be widened to 24 feet, cross-section "K", Appendix C.

New Location Projects

New TIP project from SR 1126 (Popular Creek Road) to SR 1128 (Ruin Creek Road). Construct a two lane service road on new location.

System Deficiencies

US 1 / I-85 Interchange - US 1 Bypass provides for north - south through traffic along the east side of Henderson. The existing interchange at I-85 does not accommodate for south-bound I-85 traffic from US 1 Bypass. Similarly there is no ramp for north-bound traffic on I-85 to travel south on US 1 Bypass. This interchange needs to be redesigned so that it would accommodate all turning movements.

Bridge Improvements - Due to frequent flooding the elevations may need to be raised on three bridges located along Kerr Lake. The first, bridge No. 89, located on SR 1308 (Nutbush Road), the second, bridge No. 36, located on SR 1374 (Anderson Creek Road) and the third, bridge No. 40, located on SR 1369 (Jackson Town Road). Several times per year these bridges are closed due to high water in Kerr Lake causing traffic to take detours of several miles when traveling east and west in the northern part of Vance County. At the time of this report the NCDOT Hydraulics Unit was evaluating the possibility of raising the elevations of these bridges.

Bicycle Needs

This section is dedicated to addressing the bicycle needs of Vance County. Vance County has two designated bicycle routes: the Carolina Connection, NC Bike Route 1, and the North Line Trace, NC Bike Route 4. Because of this designation, these facilities may be subjected to more bicycle

traffic than other facilities of similar design. Due to this shared, or multi-modal, use of these facilities, it is recommended that sub-standard sections be widened to a standard 24-foot cross section with 2-foot paved shoulders. These improvements will enhance safety and the functional design of the facility. The following facilities are part of designated bicycle routes in Vance County and have sub-standard widths.

Carolina Connection (NC Bike Route 1)

SR 1304 (Dabney Road): From Granville County Line to SR 1308
SR 1308 (Glebe Road): From SR 1304 to SR 1319
SR 1319 (Satterwhite Point Road): From SR 1308 to SR 1374
SR 1374 (Anderson Creek Road): From SR 1319 to SR 1371
SR 1371 (Fleming Town Road): From SR 1319 to SR 1400
SR 1400 (Jackson-Royster Road): From SR 1371 to SR 1369
SR 1369 (Jackson Town Road): From SR 1400 to Warren County Line

North Line Trace (NC Bike Route 4)

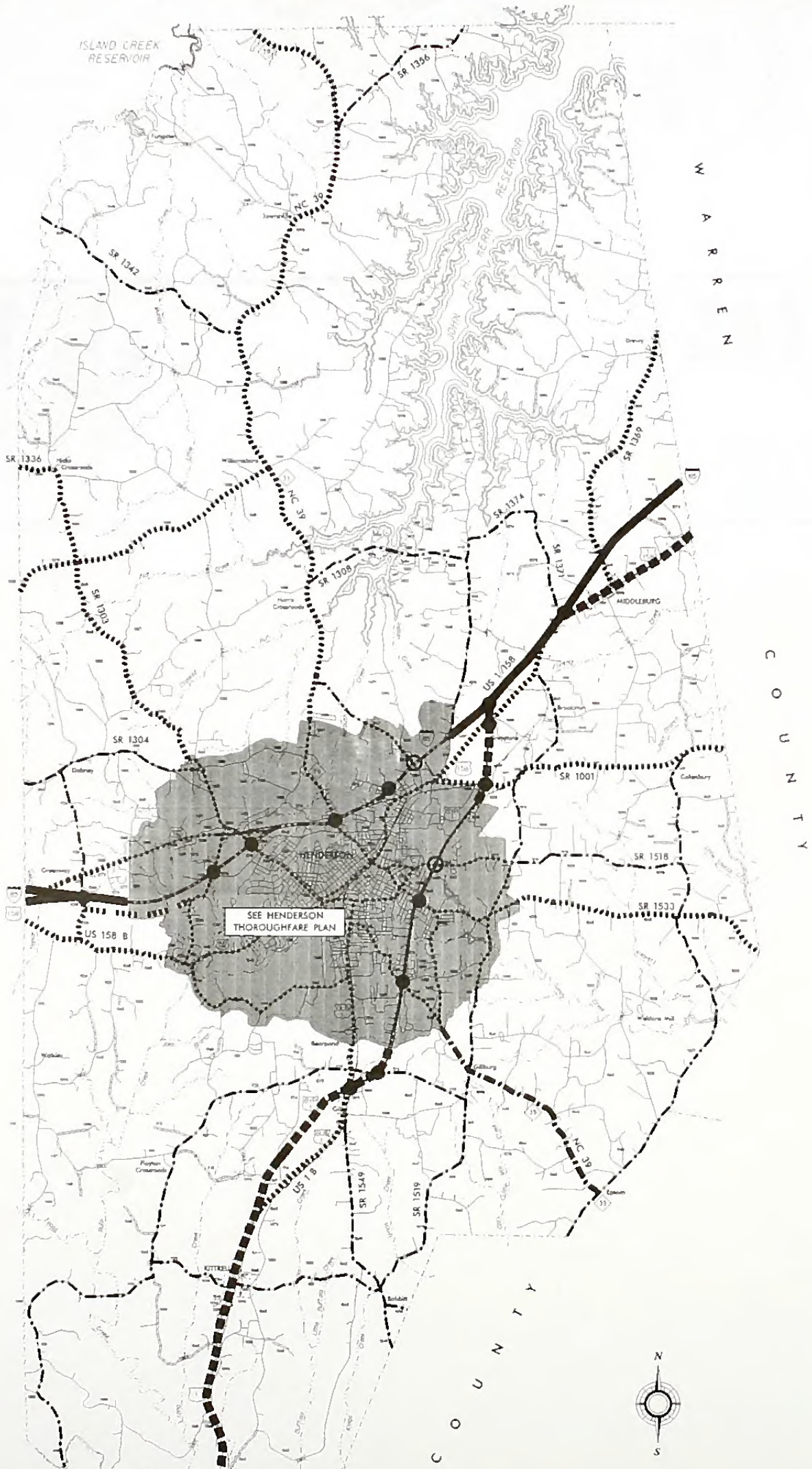
SR 1336 (Stovall Road): From Granville County Line to SR 1303
SR 1303 (Hicksboro Road): From SR 1336 to SR 1308
SR 1308 (Glebe Road): From SR 1303 to SR 1319
SR 1319 (Satterwhite Point Road): From SR 1308 to SR 1374
SR 1374 (Anderson Creek Road): From SR 1319 to SR 1371
SR 1371 (Fleming Town Road): From SR 1319 to SR 1400
SR 1400 (Jackson-Royster Road): From SR 1371 to SR 1369
SR 1369 (Jackson Town Road): From SR 1400 to Warren County Line

When considering the widening of these facilities, it is recommended that the Office of Bicycle and Pedestrian Transportation (NCDOT) be consulted. They can help provide the most appropriate cross section for the widening. They may also provide assistance in identifying the need for bicycle improvements based on present and future bicycle traffic. The County should contact the coordinator of this branch for further consideration and assistance.

Bicycle and Pedestrian Program
NC Department of Transportation
P.O. Box 25201
Raleigh, NC 27611

Public Involvement

The Vance County Thoroughfare Plan was officially started in February 1997 by a meeting with the County Transportation Advisory Committee, and a presentation to the Vance County Planning Board. On May 20th, 1997 preliminary findings were presented to the Transportation Advisory Committee with their Board of Transportation Member present. Upon completion of this meeting it was recommended that a Public Drop-in Session be scheduled. The public drop-in was held on June 12, 1997 in the Henderson Public Library. Comments from the drop-in session were presented to the Transportation Committee on July 15, 1997. After this meeting it was recommended by the Vance County Transportation Advisory Committee that the proposed plan be presented to the County Commissioners. A presentation for the Vance County Commissioners was held on August 4, 1997. The Public Hearing for the Thoroughfare Plan was held on September 2, 1997. Members of the public were present, and positive comments were made regarding the Plan. At the close of the Public Hearing, the County Commissioners moved to adopt the Vance County Thoroughfare Plan. This Plan was adopted by the North Carolina Board of Transportation on October 3, 1997.



SEPTEMBER 2, 1997

THOROUGHFARE PLAN
for
VANCE COUNTY

LEGEND

- Interstate
- Other Principal Arteriols
- Minor Arteriols
- Major Collectors
- Prop. Major Collectors
- Minor Collectors
- Urban Freeway
- Urban Major
- Henderson ETJ
- Interchange
- Grade Seperation

ADOPTED BY:

Vance County	September 2, 1997
Recommended by: Statewide Planning	September 10, 1997
NCDOT	October 3, 1997
Public Hearing	September 2, 1997

FIGURE 2

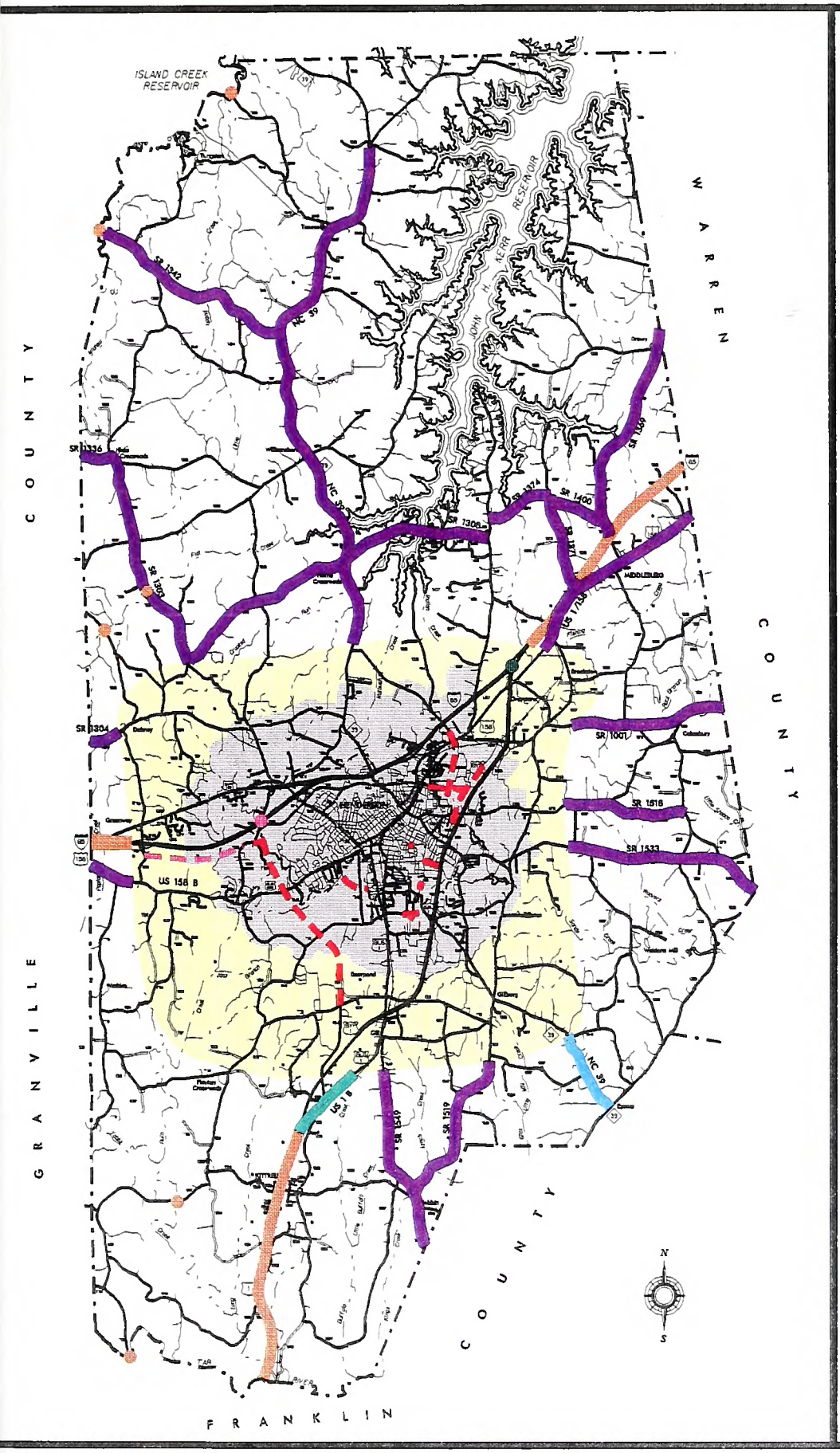
Vance County
NORTH CAROLINA

prepared by the
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT
in cooperation with the
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

1 0 1 2 3 4
miles

1 0 1 2 3 4 5
kilometers



Preliminary Recommendations for Roadway Improvements

- Current TIP Projects
- TIP Bridge Projects
- New TIP Projects
- New TIP Interchange Projects
- Proposed Interchange Improvement
- Recommended Cross-Section "C" (5 lane curb & gutter)
- Recommended Cross-Section "K" (24' wide)
- Recommended Cross-Section "G" (4 lane curb & gutter)
- Henderson Thoroughfare Plan New Facility
- Henderson Planning Area
- Henderson ETJ

FIGURE 3

Vance County
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

1 0 1 2 3 4
miles

1 0 1 2 3 4 5
kilometers

Chapter 3

Implementation of the Thoroughfare Plan

Once the thoroughfare plan has been developed and adopted, implementation is one of the most important aspects of the transportation plan. Unless implementation is an integral part of this process, the effort and expense associated with developing the plan are lost. There are several tools available for use by the County to assist in the implementation of the thoroughfare plan. They are described in detail in this Chapter.

State-County Adoption of the Thoroughfare Plan

Vance County and the North Carolina Department of Transportation (NCDOT) have mutually approved the thoroughfare plan shown in Figure 2. The mutually approved plan now serves as a guide for the Department of Transportation in the development of the road and highway system for the County. The approval of this plan by the County also enables standard road regulations and land use controls to be used effectively in the implementation of this plan.

Subdivision Controls

Subdivision regulations require every subdivider to submit to the County Planning Board a plan of any proposed subdivision. It also requires that subdivisions be constructed to meet certain standards. Through this process, it is possible to require the subdivision streets to conform to the thoroughfare plan and to reserve or protect necessary right-of-way for projected roads and highways that are to become a part of the thoroughfare plan. The construction of subdivision streets to adequate standards reduces maintenance costs and simplifies the transfer of streets to the State Highway System. Appendix D outlines the recommended subdivision design standards as they pertain to road construction.

Land Use Controls

Land use regulations are an important tool in that they regulate future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve highway safety be requiring sufficient setbacks to provide for adequate sight distances and by requiring off-street parking.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering Branch of the NCDOT. In addition, any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) may be comprehensively studied by staff from the Traffic Engineering Branch, Planning and Environmental Branch, and/or Roadway Design Unit of NCDOT. If done at an early stage, it is often possible to significantly improve the development's accessibility while preserving the integrity of the thoroughfare plan.

Funding Sources

County Construction Account

These funds are used to pave unimproved roads, widen roadways, stabilize dirt roads, make minor alignment improvements, and even construct short connectors when appropriate. These improvements are done on a priority bases that is developed by the Division Offices. For more information on County Construction Account Funds, contact the Division Engineer's Office.

Division Five Engineer's Office
NC Department of Transportation
2612 N. Duke Street
Durham, NC 277004

Transportation Improvement Program

North Carolina's Transportation Improvement Program (TIP) is a document which lists all major construction projects the Department of Transportation plans for the next seven years. Similar to local Capital Improvement Program projects, TIP projects are matched with projected funding sources. Each year when the TIP is updated, completed projects are removed, programmed projects are advanced, and new projects are added.

During annual TIP public hearings, municipalities request projects to be included in the TIP. A Board of Transportation member reviews all of the project requests in a particular area of the state. Based on the technical feasibility, need, and available funding, the board member decides which projects will be included in the TIP. In addition to highway construction and widening, TIP funds are available for bridge replacement, highway safety, public transit, railroad crossings, and bicycle facilities.

Industrial Access Funds

If an Industry wishes to develop property that does not have access to a state maintained highway and certain economic conditions are met, then funds may be made available for construction of an access road.

Small Urban Funds

Small Urban funds are annual discretionary funds made to municipalities with qualifying projects. The maximum amount is $1,000,000 per year per division. A town may have multiple projects. Requests for Small Urban Fund assistance should be directed to the appropriate Board of Transportation member and Division Engineer.

The North Carolina Highway Trust Fund Law

The Highway Trust Fund Law was established in 1989 as a plan with four major goals for North Carolina's roads and highways. These goals are:

1. To complete the remaining 1,716 miles (2,768 km) of four lane construction on the 3,600 mile (5,806 km) North Carolina Intrastate System.

2. To construct a multilane connector in Asheville and portions of multilane loops in Charlotte, Durham, Greensboro, Raleigh, Wilmington, and Winston-Salem.

3. To supplement the secondary roads appropriation in order to pave, by 1999, 10,000 miles (16,129 km) of unpaved secondary roads carrying 50 or more vehicles per day, and all other unpaved secondary roads by 2006.

4. To supplement the Powell Bill Program.

The portion of this bill which will benefit Vance County, over the thirty year planning period, is the paving of most, if not all, of its unpaved roads on the State maintained system. For more information on the Highway Trust Fund Law, contact the Program Development Branch of the North Carolina Department of Transportation.

Implementation Recommendations

The following table provides a break down of the projects in the Vance County Thoroughfare Plan and the corresponding method that would best suit the implementation of the given project.

Table 1

Funding Sources and Methods Recommended for Implementation of Projects

Projects	Funding Sources				Methods of Implementation			
	Local Funds	TIP Funds	Indust. Access	Small Urban	T-fare Plan	Subdiv. Ord.	Zoning Ord.	Development Review
US 1/158		X			X			
NC 39 South Henderson		X			X		X	X
US 158 Business		X			X			
NC 39 North Henderson		X			X			
US 1 Business		X			X		X	X

Construction Priorities and Cost Estimates

Construction priorities will vary depending on what criteria are considered and what weight is attached to the various criteria. Most people would agree that improvements to the major thoroughfare system and major traffic routes would be more important than minor thoroughfares where traffic volumes are lower. To be in the North Carolina Transportation Improvement Program, a project must show favorable benefits relative to costs and should not be prohibitively disruptive to the environment. The potential cost estimate of the Vance County projects with respect to the user benefits, and the probabilities that economic development will be stimulated and environmental impact will be minimized are given in Table 3. A guide to this table is shown in Table 2.

Table 2

Probability Estimation Guide

Subjective Evaluation	Impact Probability
Excellent - very substantial	1.00
Very good - substantial	0.75
Good - considerable	0.50
Fair - some	0.25
Poor - none	0.00

Reduced road user cost should result from any roadway improvement, from a simple widening to the construction of a new roadway. Roadway improvements should also relieve congested or unsafe conditions. Comparisons of the existing and the proposed facilities have been made in terms of vehicle operating costs, travel time costs, and accident costs. These user benefits are computed as total dollar saving over the 30 year design period using data such as project length, base year and design year traffic volumes, traffic speed, type of facility, and volume capacity ratio.

The impact of a project on economic development potential is shown as the probability that it will stimulate the economic development of an area by providing access to developable land and reducing transportation costs. It is a subjective estimate based on the knowledge of the proposed project, local development characteristics, and land development potential. The probability is rated on a scale from 0 (representing no development potential) to 1.00 (representing excellent development potential).

The environmental impact analysis considers the effect of a project on the physical, social/cultural, and economic environment. Below are listed the thirteen items that are considered when evaluating the impacts on the environment

* air quality
* water resources
* soils and geology
* wildlife
* vegetation
* neighborhoods noise
* noise
* educational facilities
* churches
* parks and recreational facilities
* historic sites and landmarks
* public health and safety
* aesthetics

The environmental impact analysis also uses a probability rating from 0 (representing no benefit to the environment) to 1.00 (representing a positive impact to the environment.) A negative value is assigned to the probability to indicate a negative impact. The summation of both positive and negative impacts probabilities with respect to these factors provides a measure of the relative environmental impacts of a project. Table 2 shows the probability scale used in the analysis. This table can be used as a guideline for interpreting the "Economic Development" and Environmental Impact" values given in Table 3.

Table 3

Benefits Evaluation for Major Projects

Projects	Benefits (millions)	Costs (millions)	Length mi.	Benefits/ mi.	Economic Development	Environ. Impact
US 1/158	10.22	1.74	4.5	2.27	0.125	+0.25/-0.00
NC 39 South	12.55	5.20	2.0	6.28	0.375	+0.18/-0.10
US 158 Business	1.79	1.11	1.0	1.79	0.250	+0.18/-0.00
NC 39 North	19.42	4.62	11.0	1.77	0.500	+0.20/-0.00
US 1 Business	0.81	6.88	2.0	0.41	0.375	+0.13/-0.00

Offsetting the benefits that would be derived from any project is the cost of its construction. A new facility, despite its high projected benefits, might prove to be unjustified due to the excessive costs involved in construction. The highway costs estimated in this report are based on the average statewide construction costs for similar project types. The anticipated right-of-way costs are also included as an average cost per acre for property throughout Vance County according to the respective project. Table 4 provides a break down of total project cost into construction cost and right-of-way cost for the major project proposals for the Thoroughfare Plan.

Table 4

Potential Project Cost Estimates for Major Projects

Project Description	Construction Cost	Right-of-way Cost	Total Cost
US 1/158	1,629,456	112,500	1,741,957
NC 39 South of Henderson	5,195,421	321,320	5,516,741
NC 158 Business	1,086,304	25,000	1,111,304
NC 39 North of Henderson	4,345,218	275,000	4,620,218
US 1 Business	6,412,926	470,000	6,882,926

Chapter 4

Analysis of Vance County's Roadway System

This chapter presents an analysis of the ability of the existing street system to serve the area's travel desires. Emphasis is places not only on detecting the deficiencies, but on understanding their cause. Travel deficiencies may be localized and the result of substandard highway design, inadequate pavement width, or intersection controls. Alternately, the underlying problem may be caused by a system deficiency such as a need for a bypass, loop facility, construction of missing links, or additional radials.

An analysis of the roadway system must first look at existing travel patterns and identify existing deficiencies. This includes roadway capacity and safety analysis. After the existing picture of travel in the area has been developed, the engineer must analyze factors that will impact the future system. These factors include forecasted population growth, economic development potential, and land use trends. This information will be used to determine future deficiencies in the transportation system.

Current Transportation Plans for Vance County

Thoroughfare Plans

Thoroughfare plans are a tool to aid officials in the development of an appropriate transportation system. It is important that the communities within a County, and the County officials cooperate as a team in the development of their transportation system. Plan development and implementation jointly undertaken will help ensure the development of an efficient system for travel throughout the County. The following thoroughfare planning studies have previously been done for Vance County:

1. Henderson, plan adopted in 1995

Transportation Improvement Program Projects

As covered in Chapter 3, the Transportation Improvement Program (TIP) is a seven year project planning document that lists the major transportation improvement projects that the Department of Transportation has planned. These projects include not only roadway projects, but also bridge projects, railroad crossings, bicycle facilities, and public transportation. Vance County has several roadway projects identified in the 1997-2003 TIP, these projects are listed below:

1. I-85 from US 158 (mile post 213.5) in Vance County to South of SR 1210 (mile post 232.5) in Warren County. Pavement rehabilitation and safety improvements.

2. I-85 from US 158 to North of NC 39 (exit 214) replace substandard guardrail.

3. I-85 from Vance County line (mile post 208.5) to US 158 (mile post 213.5) in Vance County. Pavement and bridge rehabilitation.

4. US 1 Business from US 1 Bypass to SR 1267 (Dabney Drive). Widen roadway to a five lane curb and gutter facility.

5. In Henderson, western outer loop, SR 1101 (Belmont Drive) to SR 1128 (Ruin Creek Road). Construct a two lane facility on multi-lane right-of-way, new location.

Existing Travel Pattern and Deficiencies

Traffic Demand

Travel demand is generally reported in average daily traffic counts. Traffic counts are taken regularly in several locations within Vance County by the North Carolina Department of Transportation. The 1996 average daily traffic counts for Vance County are shown in Figure 5.

Width and Alignment Deficiencies

North Carolina's standard for highway construction calls for 11-foot (3.35m) lanes on all highways with traffic volumes greater than 2,000 ADT (Average Daily Traffic) or design speeds greater than 50 miles per hour. This includes all primary arterials. A 9-foot (2.74m) minimum lane width can be tolerated on collector roads with an ADT of less than 4,300 vehicles per day. The minimum level of service for minor collector roads dictates a 40 mph design speed during peak traffic conditions. These standards are summarized below in Table 5.

Table 5

Minimum Tolerable Lane Width

Average Daily Traffic	Principal Arterials		Minor Arterials		Collectors	
	feet	meters	feet	meters	feet	meters
over 2,000	11	3.35	11	3.35	11	3.35
400 - 2,000	---	------	10	3.05	10	3.05
100 - 400	---	------	10	3.05	9	2.74
below 100	---	------	---	------	9	2.74

There are a number of roadways in Vance County that have substandard widths. Because of the substantial cost of upgrading all secondary roads to standard (24' pavement), narrow widths may have to be tolerated until sufficient funds are available for improvements. The roads identified as a part of the Vance County's Thoroughfare Plan study that have substandard widths are listed below:

SR 1001 (Warrenton Road)
SR 1303 (Hicks Road/Hicksboro Road)
SR 1304 (Dabney Road)
SR 1308 (Glebe Road/Nutbush Road)
SR 1336 (Stovall Road)
SR 1342 (Morgan Road)
SR 1369 (Jackson Town Road)
SR 1371 (Fleming Town Road)
SR 1374 (Anderson Creek Road)
SR 1533 (Vicksboro Road)
SR 1400 (Jackson Royster Road)
SR 1519 (Gillburg Road/Cary Chapel Road)
SR 1549 (Bobbit Road)
SR 1518 (Newton Dairy Road)

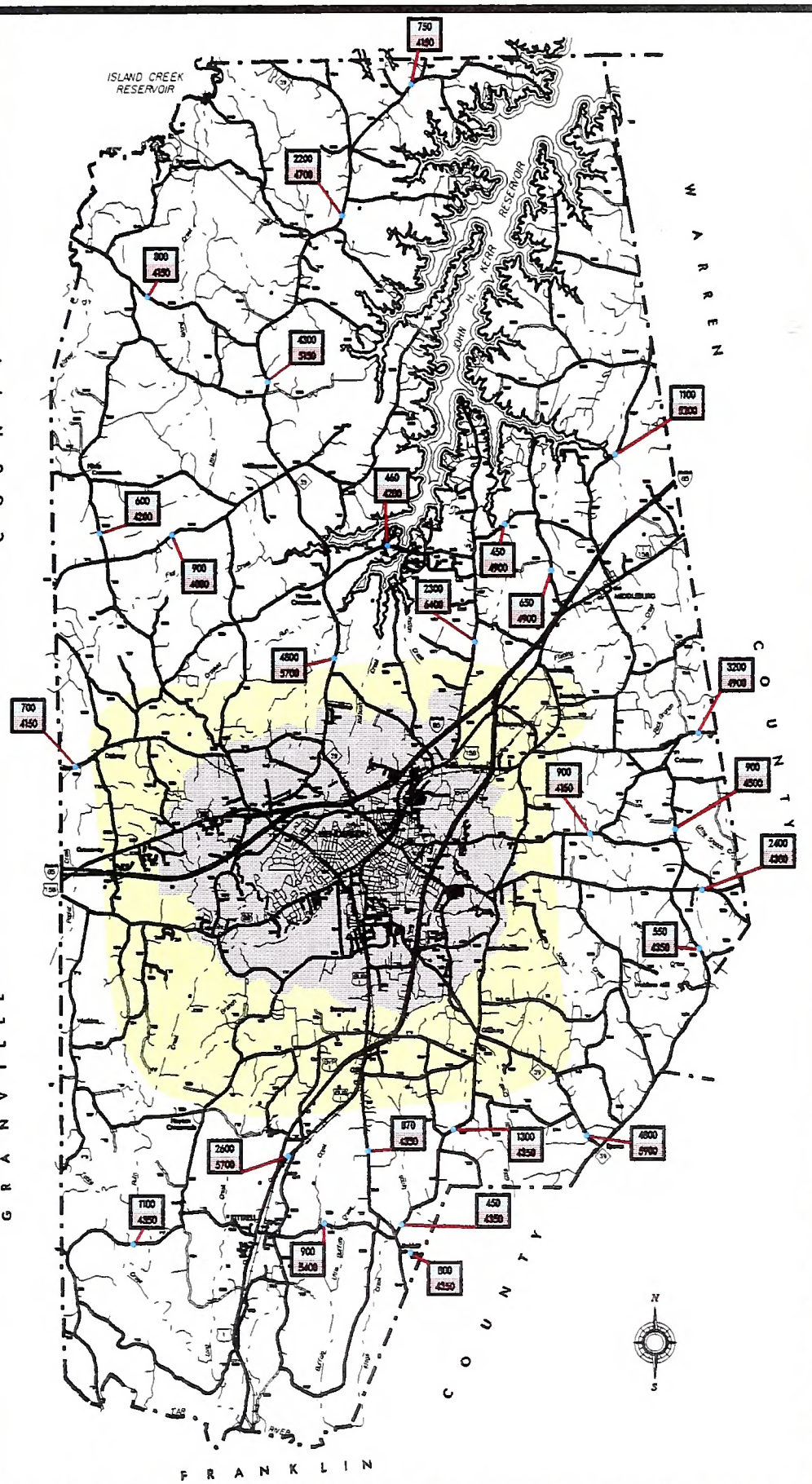
Capacity Analysis of the Existing System

An indication of the adequacy of the existing street system is a comparison of traffic volumes versus the ability of the streets to move traffic freely at a desirable speed. The ability of a street to move traffic freely, safely, and efficiently with a minimum delay is controlled primarily by the spacing of major devices utilized. Thus, the ability of a street to move traffic can be increased by restricting parking and turning movements, using proper sign and signal devices, and by the application of other traffic engineering strategies.

Capacity is the maximum number of vehicles which has a "reasonable expectation" of passing over a given section of a roadway, during a given time period under prevailing roadway and traffic conditions. Roadway capacities and 1996 average daily traffic for facilities in Vance County are shown in Figure 4. There is currently no facility in Vance County that is over capacity.

The relationship of traffic volumes to the capacity of the roadway will determine the level of service (LOS) being provided. Six levels of service have been selected for analysis purposes. They are given letter designations from A to F with LOS A representing the best operating conditions and LOS F the worst.

The six levels of service are illustrated in Figure 5, and they are defined on the following pages. The definitions are general and conceptual in nature, but may be applied to urban arterial levels of service. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them. The 1994 Highway Capacity Manual contains more detailed descriptions of the levels of service as defined for each facility type.



Legend

1996 Average Daily Traffic Roadway Capacity

Location

Figure 4

1996 Average Daily Traffic Over Capacity

Vance County
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

1 0 1 2 3 4
miles

1 0 1 2 3 4 5
kilometers

Level of Service

LOS A
Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents of breakdown are easily absorbed. Even at the maximum density, the average spacing between vehicles is about 528 ft, or 26 car lengths.

LOS B
Represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted. The lowest average spacing between vehicles is about 330 ft, or 18 car lengths.

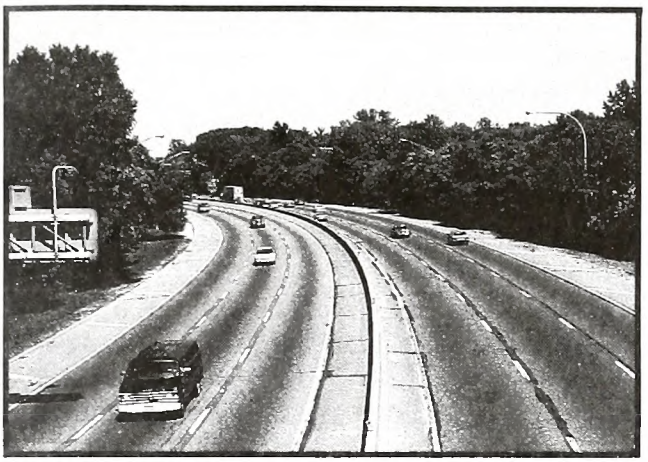
LOS C
Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage. Minimum average spacings are in the range of 220 ft, or 11 car lengths.

LOS D
Borders on unstable flow. Density begins to deteriorate somewhat more quickly with increasing flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. At the limit, vehicles are spaced at about 165 ft, or nine car lengths.

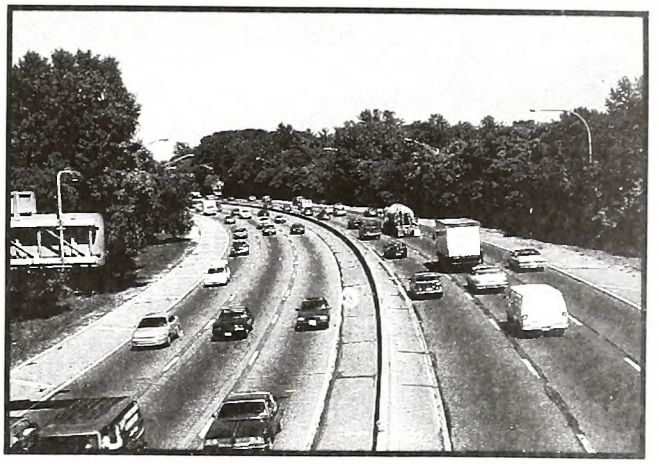
LOS E
Describes operation at capacity. Operations at this level are extremely unstable, because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles to give way to admit the vehicle. This can establishes a disruption wave that propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing. Vehicles are spaced at approximately six car lengths, leaving little room to maneuver.

LOS F
Describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.

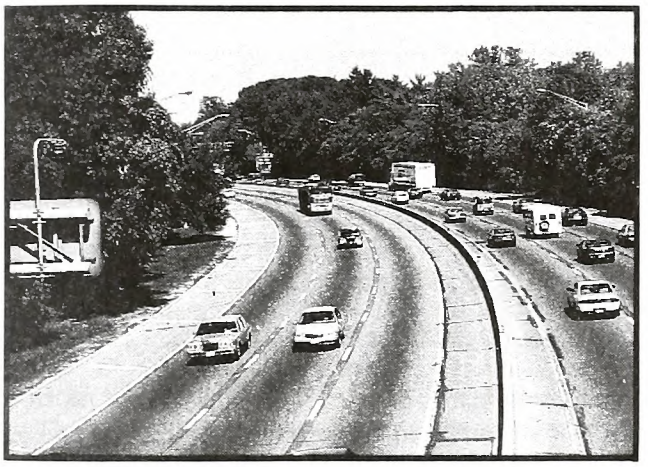
Source: 1994 Highway Capacity Manual



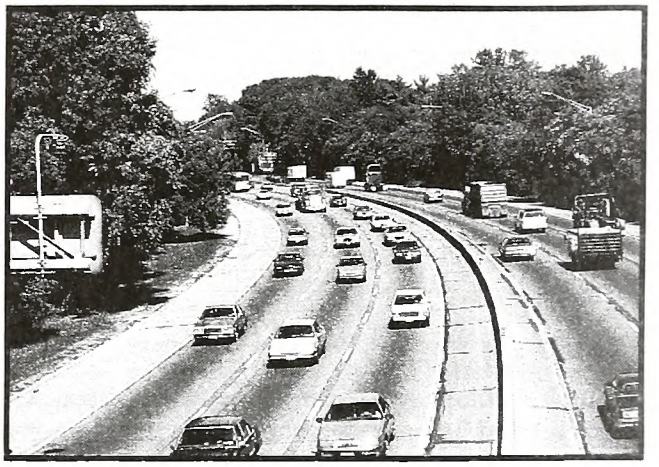
LOS A.



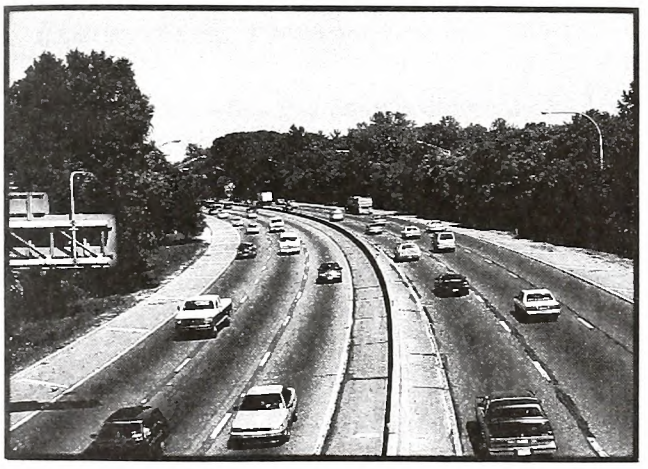
LOS D.



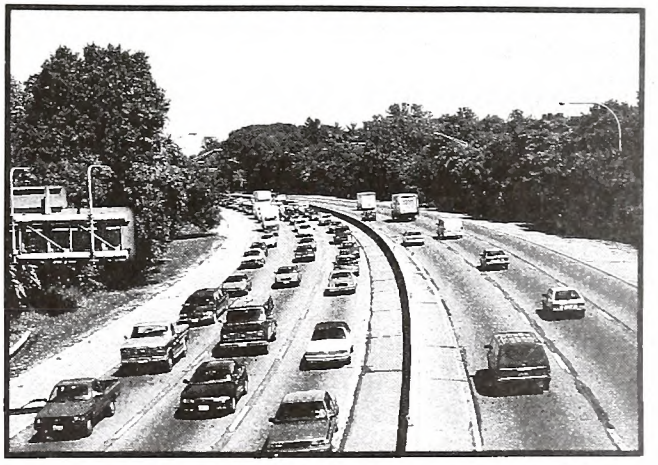
LOS B.



LOS E.



LOS C.



LOS F.

LEVELS OF SERVICE **FIGURE 5**

Traffic Accidents

Traffic accidents are often used as an indicator for locating congestion problems. Traffic accident records can also be reviewed to identify problem locations or deficiencies such as poor design, inadequate signing, ineffective parking, or poor sight distance. Accident patterns developed from analysis of accident data can lead to improvements that will reduce the number of accidents.

Table 6 is a summary of the accidents occurring in Vance County between June 1993 and June 1996. This table only includes locations with 10 or more accidents. The "Total" column indicates the total number of accidents reported within 200 ft (61.0 m) of the intersection during the study period indicated. The severity listed is the average accident severity for that location.

Table 6

Location with 10 or More Accidents in a Three -Year Period

Locations	Angle	Rear End	Ran Off Road	Left Turn	Right Turn	Other	Total	Severity
I-85 & US 1	0	1	6	3	0	0	10	3.22
I-85 & SR 1371	0	2	6	0	0	2	10	2.48
US 158 & SR 1128	11	3	2	3	0	1	20	8.86
US 1 B & SR 1115	4	4	1	0	1	0	10	12.28
NC 39 & SR 1519	6	3	1	2	0	2	14	3.64
SR 1001 & SR 1519	0	4	0	9	0	0	13	12.52

Both the severity and number of accidents should be considered when investigating accident data. The severity of every accident is measured with a series of weighting factors developed by NCDOT's Division of Highways. In terms of these factors, a fatal or incapacitating accident is 47.7 times more severe than one involving only property damage, and an accident resulting in minor injury is 11.8 times more severe than one with only property damage. To request a more detailed accident analysis for any of the above mentioned intersections, or other intersections of concern, the County should contact the Division 5 Traffic Engineer.

Existing Bridge Conditions

Bridges are a vital and unique element of a highway system. First, they represent the highest unit investment of all elements of the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity of all potential highway failures for disruption of community welfare. Finally, and most importantly, a bridge represents the greatest opportunity of all highway failures for loss of life. For these reasons, it is imperative that bridges be constructed to the same design standards as the system of which they are a part.

Congress enacted the National Bridge Inspection Program Standards on April 27, 1971, implementing the Federal Highway Act of 1968. These standards require that "all structures designed as bridges located on any of the Federal-Aid Highway Systems be inspected and the safe load carrying capacity computed at regular intervals, not to exceed two years." A sufficiency index

number has been calculated for each bridge to establish eligibility and priority for replacement. The bridges with the highest priority are replaced as Federal-Aid fund and State funds become available.

The North Carolina DOT's Bridge Maintenance Unit, with assistance from various consultants, inspects all bridges on the State Highway System. All bridges in Vance County have been analyzed, rated and inventoried. The resulting data has been reduced to a more readily usable form as a management tool.

A sufficiency rating was used in the analysis to determine the deficiency of each bridge. The sufficiency rating is a method of evaluating factors that determine whether a bridge is sufficient to remain in service. Factors used include:

- structural adequacy and safety
- serviceability and functional obsolescence
- essentiality for public use
- type of structure
- traffic safety features

The result of this method is a percentage in which 100 percent represents an entirely sufficient bridge and zero percent represents an entirely insufficient or deficient bridge. A sufficiency rating of 50 percent or less qualifies for Federal Bridge Replacement Funds.

Deficient bridges are categorized as either functionally obsolete or structurally deficient. Bridges in the functionally obsolete category have below average ratings in approach roadway alignment, under clearance, deck geometry, waterway adequacy, or structural condition. Structurally deficient bridges have below average ratings in deck superstructure, substructure, overall structural conditions, or waterway adequacy. Table 7 shows the ten most structurally deficient bridges in Vance County.

Table 7

Ten Most Structurally Deficient Bridges in Vance County

Bridge Number	Facility Carried	Location	Ratings
3	SR 1107	1.4 mi. W. of SR 1107	32.4
5	SR 1110	1.6 mi. S. JCT SR 1107	25.8
7*	SR 1101	0.7 mi. S. JCT SR 1104	26.0
9*	SR 1101	1.5 mi. S. SR 1102	25.7
11	SR 1104	2.1 mi. E. SR 1102	54.4
12	SR 1105	0.5 mi. W. JCT US 1	38.7
15	SR 1125	0.5 mi. S. JCT SR 1124	28.8
19*	SR 1306	0.5 mi. N. JCT SR 1305	25.0
51	SR 1513	0.6 mi. N JCT SR 1518	53.3
53	SR 1523	0.4 mi. S. JCT SR 1525	17.4
70	SR 1326	1.1 mi. N. SR 1308	47.8
73*	SR 1350	2.4 mi. N. JCT SR 1348	26.3

Note * - Denotes the Bridge is in the current Transportation Improvement Program.

Factors Affecting the Future Roadway System

The objective of thoroughfare planning is to develop a transportation system that will meet future travel demand and enable people and goods to travel safely and economically. To determine the needs of an area it is important to understand the role of population, economics and land use have on the highway system. Examination of these factors help to explain historic travel patterns and lays the groundwork for thoroughfare planning.

Population

The amount of traffic on a section of roadway is a function of the size and location of the population which it serves. Investigating past trends in population growth and forecasting future population growth and dispersion is one of the first steps for a transportation planner. Table 8 shows the historical and projected population trends for Vance County through 2025. Table 9 shows population trends for the Township in Vance County.

Table 8

Vance County Population Forecasts

Year	Population	Percent Change
1950	32,101	
1960	32,002	-.31
1970	32,691	2.15
1980	36,748	12.41
1990	38,892	5.83
1996	40,537	4.22
2000	41,060	1.29
2010	43,617	6.22
2020	43,765b	.33
2025	44,178b	.94

Note: a - Estimate by Office State Budget and Management
b- Projection based on past trends

Table 9

Vance County Population by Township

Township	1970	1980	1990	1980-1990
Dabney	954	1,454	1,967	0.35
Henderson	20,807	22,300	22,247	-0.002
Kittrell	2,913	3,260	4,147	0.27
Middleburg-Nutbush	2,145	2,727	2,766	0.01
Sandy Creek	2,513	3,090	4,162	0.35
Townsville	1,530	1,530	1,181	-0.23
Watkins	409	508	592	0.17
Williamsboro	1,420	1,879	1,830	-0.03

Economy and Employment

One of the more important factors to be considered in estimating the future traffic growth of an area is its economic base. The number of employers and the employee's income or purchasing power influences how much population can be supported in the area and the number of motor vehicles that will be locally owned and operated. Generally, as the family income increases so does the number of vehicles owned, as well as the number of vehicles trips generated per day by each household. An accurate projection of the future economy of the area is essential to estimating future travel demand.

Factors which will influence economic growth and development in Vance County over the 28 year planning period include the expansion of the Henderson Urbanized Area. Another area that could influence economic growth of Vance County in the future is the development in southern Vance County do to the development in the Raleigh Area.

Land Use

Land use refers to the physical patterns of activities and functions within a City or County. Nearly all traffic problems in a given area can be attributed in some form to the type of land use. For example, a large industrial plant might be the cause of congestion during shift change hours as its workers come and go. However, during the remainder of the day few problems, if any, may occur. The spatial distribution of different types of land uses is the predominant determinant of when, where, and why travel varies depending on the size, type, intensity, and spatial separation of each.

For use in transportation planning, land uses are grouped into four categories:

1. Residential - all land devoted to the housing of people (excludes hotel and motels)
2. Commercial - all land devoted to retail trade including consumer and business services and offices.
3. Industrial - all land devoted to manufacturing, storage, warehousing, and transportation of products
4. Public - all land devoted to social religious, educational, cultural, and political activities.

Anticipated future land use is a logical extension of the present spatial distribution. Determination of where expected growth is to occur within the planning area facilitates the location of proposed thoroughfares or the improvements of existing thoroughfares. Areas of anticipated development and growth for Vance County are:

1. Residential - southern, central
2. Commercial/Retail - central, southwestern
3. Industrial - central, southwestern
4. Public - continued preservation of Kerr Lake

The southern portions of the planning area have the largest growth expectations. This development is anticipated due to the continued growth of Raleigh and Wake County. The slowest growth is expected to occur in the northern portions of the County. This slow growth is attributed primarily to the fact that most of the commercial, retail, and industrial development will occur in the central to southern portions of the County due to access to the I-85 corridor and the population center associated with Henderson.

Forecasted Travel Patterns and Deficiencies

Future Travel Demand

Future travel demand can be forecasted by looking at past traffic trends and calculating the average annual growth rates along any particular route. Using the past trends along with the projected land uses and the forecasted population growth, the transportation planner is able to forecast future travel demand and to predict where future problems may occur. For this study Average Daily Traffic (ADT) counts for the past thirty years were used in a linear regression analysis to estimate future ADT counts. Figure 6 and Table B-1 in Appendix B provides forecasted traffic for the major and minor thoroughfares in Vance County.

Capacity Deficient Corridors

Capacity deficient Corridors were determined using the volume/capacity ratio (V/C), with the projected traffic over the practical capacity of the facility. A (V/C) ratio less then one is tolerable. Based on this analysis, several roadways in Vance County are anticipated to be inadequate by the planning year 2025 (See Figure 6).

- **NC 39 South of Henderson**
- **US 1 Business**
- **SR 1549 (Bobbit Road) South of Henderson**
- **NC 39 North of Henderson to SR 1342**
- **SR 1001 (Warrenton Road) East of Henderson**
- **SR 1533 (Vicksboro Road) East of Henderson**

Traffic congestion on these routes can be alleviated by widening to increase traffic carrying ability. See Chapter 2 for recommendations.

Streets Approaching Capacity

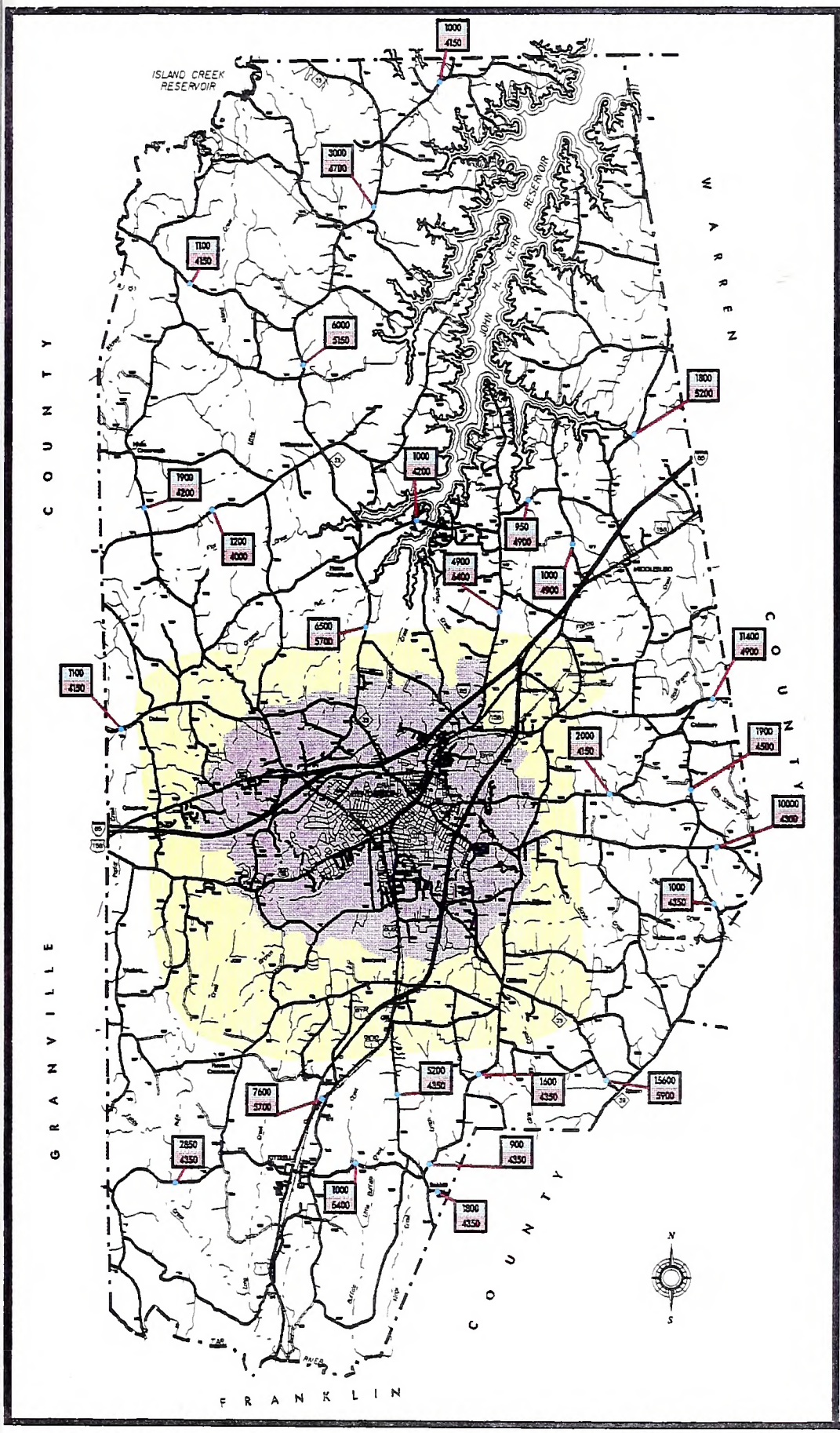
Other roadways in the planning area are not expected to have congestion problems within the planning period. However, to improve safety and operating conditions, it is recommended that the functionally classified roadways in Vance County with substandard lane widths less then 12-feet (3.66m) be upgraded to reflect this desired width.

System Deficiencies

System deficiencies result from a lack of a cohesive, continuous, and complimentary major street network. More simply put, a system deficiency exists when drivers must go out of their way to get from point A to point B, or when the path for getting there is not cohesive or continuous. The thoroughfare plan study has identified the routes SR 1308, SR 1304, SR 1400 and SR 1369 as a system deficient corridor due to periodic flooding throughout the year. This route connects the north western side of Vance County with the east, with improvements to the bridge locations on SR 1308, SR 1374 and SR 1369 this corridor could be used year round by traffic traveling across Vance County. When this area floods it causes major disruptions in the northern part of Vance County.

Intersection Deficiencies

Problems with intersection design or control can contribute to poor movement of traffic, increased traffic accidents, and driver irritation. Most of the major traffic intersections within Vance County are located within the Henderson urban area. The two major concerns of Vance County is the interchange facility at I-85 and US 1 and the intersection of Ruin Creek Road and US 158. The intersection of Ruin Creek Road and US 158 has been studied in the past by the Division 5 Office to determine the need for a traffic signal. At this time no signal is warranted. The interchange problem has not been studied, but improvements to this interchange have been recommended in both this report and the Henderson Thoroughfare Plan.



Legend

- 2025 Average Daily Traffic / Roadway Capacity
- Location
- Henderson Planning Area
- Henderson ETJ

Figure 6

2025 Average Daily Traffic Over Capacity

Vance County
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

1 0 1 2 3 4
miles

1 0 1 2 3 4 5
kilometers

Consideration of Environmental Factors

In the past several years, environmental considerations associated with highway construction have come to the forefront of the planning process. The legislation that dictates the necessary procedures regarding environmental impacts is the National Environmental Policy Act, Section 102 of this act requires the execution of an environmental impact statement, or EIS, for road projects that have a significant impact on the environment. Included in an EIS would be the project's impact on wetlands, water quality, historic properties, wildlife, and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, preliminary research was done on several of these factors and is included below.

Wetlands

In general terms, wetlands are lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. The single feature that most wetlands share is soil or substrata that is at least periodically saturated with or covered by water. Water creates severe physiological problems for all plants and animals except those that are adapted for life in it or in saturated soil.

Wetlands are crucial ecosystems in our environment. They help regulate and maintain the hydrology of our rivers, lakes, and streams by slowly storing and releasing flood waters. They help maintain the quality of our water by storing nutrients, reducing sediment loads, and reducing erosion. They are also critical to fish and wildlife populations. Wetlands provide an important habitat for about one third of the plant and animal species that are federally listed as threatened or endangered.

In this study, the impacts to wetlands were determined using the National Wetlands Inventory Mapping, available from the U. S. Fish and Wildlife Service. Wetland impacts have been avoided or minimized to the greatest extent possible while preserving the integrity of the transportation plan.

Threatened and Endangered Species

A preliminary review of the Federally Listed Threatened and Endangered Species within Vance County was done to determine the effects that new corridors could have on the wildlife. These species were identified using mapping from the North Carolina Department of Environment, Health, and Natural Resources.

The Threatened and Endangered Species Act of 1973 allows the U. S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impacts of a road project on endangered plants and animals and critical wildlife habitats. By locating rare species in the planning stage of road construction, we are able to avoid or minimize these impacts.

There was various sightings of rare plants and animals throughout Vance County. Projects of particular concern with respect to rare plants and animals include:

1. Improvements to NC 39 north of Henderson
2. SR 1533 (Vicksboro Road) improvements east of Henderson

A detailed field investigation of these corridors is recommended prior to construction of any highway project in this area.

Historic Sites

The location of historic sites in Vance County were investigated to determine the possible impacts of the various projects studied. The federal government has issued guidelines requiring all State Transportation Departments to make special efforts to preserve historic sites. In addition, the State of North Carolina has issued its own guidelines for the preservation of historic sites. These two pieces of legislation are described below:

National Historic Preservation Act - Section 106 of this act requires the Department of Transportation to identify historic properties listed in the National Register of Historic Places and properties eligible to be listed. The DOT must consider the impacts of its road projects on these properties and consult with the Federal Advisory Council on Historic Preservation.

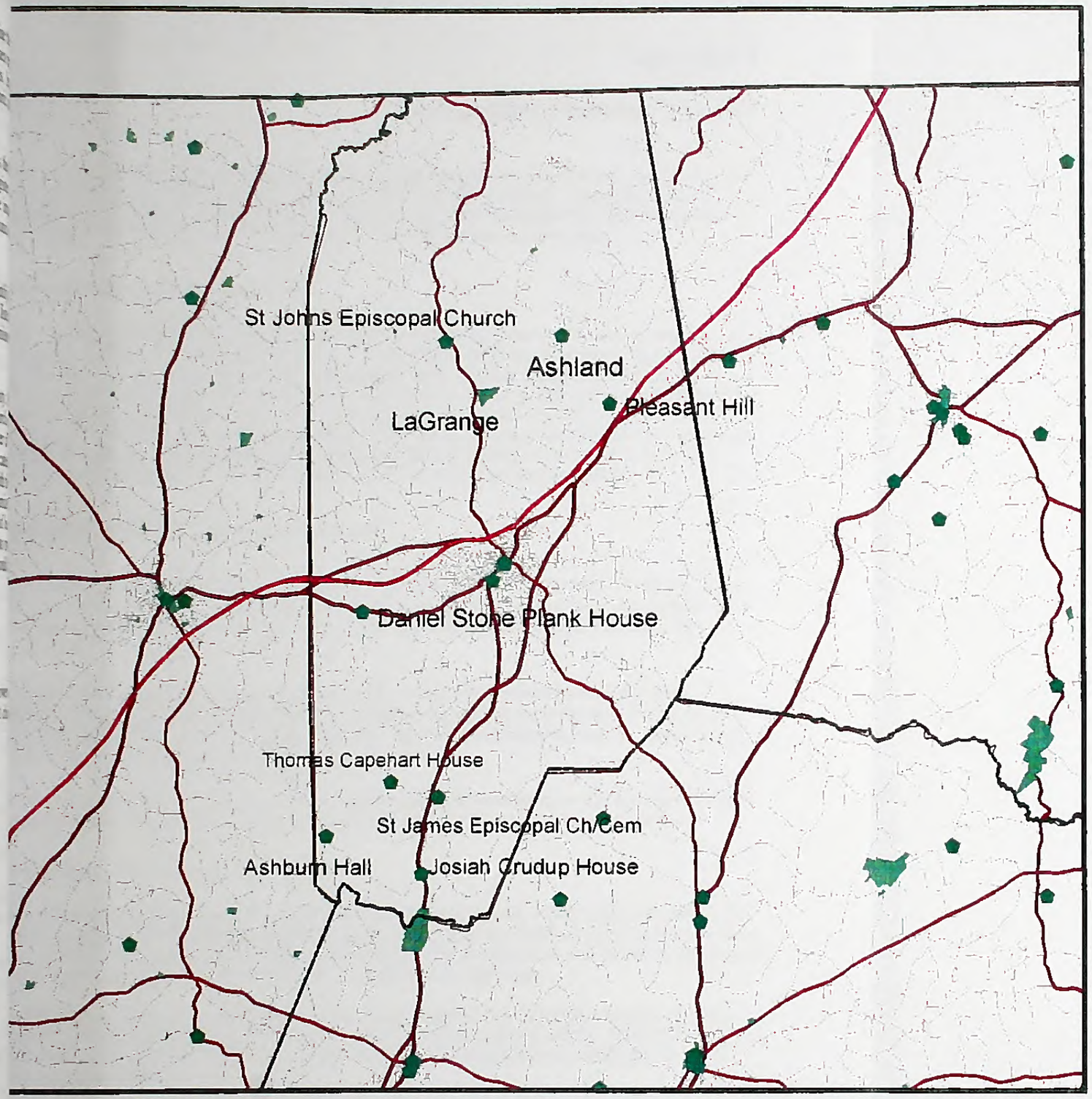
NC General Statute 121-12(a) - This statute requires the DOT to identify historic properties listed on the National Register, but not necessarily those eligible to be listed. DOT must consider impacts and consult with the North Carolina Historical Commission, but it is not bound by their recommendations.

The State Plan for Historic Preservation has several sites within Vance County. Many of these sites are located in the rural areas of Vance County. The St. Johns Episcopal Church and LaGrange Historic District located along NC 39 were identified on the National Register of Historic Places. Also the St. James Episcopal Church Cemetery and Josiah Crudup House located south of Henderson on US 1 are on the National Register of Historic Places, along with the Daniel Stone Plank House east of Henderson on US 158. All efforts will be made to minimize the impact to these sites when widening these facilities. None of the other properties should be affected by the projects proposed on the thoroughfare plan. However, care should be taken to make certain that all historic sites and natural settings are preserved. Therefore, a closer study should be done in regard to the local historic sites prior to the construction of any proposal.

Archaeology

There were no significant archaeology sites located in the Vance County. However, care should be taking to make sure that any possible archaeological sites should be looked at closer prior to the construction of any proposals.

Vance County Historic Structures



LEGEND

County Boundary (100K)
- County Boundary
- State Boundary
- Hist. Struct.-NR (Restricted-100k)
- Hist. Dist. -NR (Restricted-100k)
- Roads (100k TIGER w/ attributes)

Roads (Primary Routes - 100k)
- Interstate
- U.S.
- N.C.
- Blue Ridge Parkway
- County Boundary/Shoreline (poly-100k)

N
W E
S

FIGURE 7

Appendix A

Thoroughfare Planning Principles

There are many advantages to thoroughfare planning, but the primary mission is to assure that the road system will be progressively developed to serve future travel desires. Thus, the main consideration in thoroughfare planning is to make provisions for street and highway improvements so that, when the need arises, feasible opportunities to make improvements exist.

Benefits of Thoroughfare Planning

There are two major benefits derived from thoroughfare planning. First, each road or highway can be designed to perform a specific function and provide a specific level of service. This permits savings in right-of-way, construction, and maintenance costs. It also protects residential neighborhoods and encourages stability in travel and land use patterns. Second, local officials are informed of future improvements and can incorporate them into planning and policy decisions. This will permit developers to design subdivisions in a non-conflicting manner, direct school and park officials to better locate their facilities, and minimize the damage to property values and community appearance that are sometimes associated with roadway improvements.

County Thoroughfare Planning Concepts

The underlying notion of the thoroughfare plan is to provide a functional system of streets, roads, and highways that permits direct, efficient, and safe travel. Different elements in the system are designed to have specific functions and levels of service, thus minimizing the traffic and land service conflict.

In the county plan, elements are either urban or rural. In the urban planning area, the local municipality generally has planning jurisdiction. Outside the urban planning area, the county has planning jurisdiction. In those urban areas where no urban thoroughfare plan exists, elements are rural and are under the planning jurisdiction of the county.

Within the urban and rural systems, plan elements are classified according to the specific function they are to perform. A discussion of the elements and functions of the two systems follows.

Thoroughfare Classification Systems

Streets perform two primary functions, traffic service and land access, which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely developed abutting property lead to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets that permits travel from origins to destinations with directness, ease and safety. Different streets in this system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict.

Urban Classification

In the urban thoroughfare plan, elements are classified as major thoroughfares, minor thoroughfares, or local access streets.

Major Thoroughfares

These routes are the primary traffic arteries of the urban area and they accommodate traffic movements within, around, and through the area.

Minor Thoroughfares

Roadways classified under this under this type collect traffic from the local access streets and carry it to the major thoroughfare system.

Local Access Streets

This classification covers streets that have a primary purpose of providing access to the abutting property. This classification may be further classified as either residential, commercial and/or industrial depending upon the type of land use that they serve.

Due to the limited amount of detail that can be shown on a county thoroughfare plan, only urban major thoroughfares are shown.

Rural Classification

The facilities outside the urban thoroughfare planning boundaries make up the rural system. There are four major systems: principal arterials, minor arterials, major and minor collectors, and local roads.

Rural Principal Arterial System

This system is a connected network of continuous routes that serve corridor movements having substantial statewide or interstate travel characteristics. This will be shown by both the trip lengths and the travel densities. The principal arterial system should serve all urban areas of over 50,000 population and most of those with a population greater than 5,000. The Interstate system constitutes a significant portion of the principal arterial system.

Rural Minor Arterial System

This system forms a network that links cities, larger towns, and other major traffic generators such as large resorts. The minor arterial system generally serves intrastate and intercounty travel and travel corridors with trip lengths and travel densities somewhat less than the principal arterial system.

Rural Collector Road System

The rural collector routes generally serve intracounty travel. These routes serve travel whose distances are shorter than on the arterial routes. The rural collector road system is subclassified into major and minor collector roads.

Major Collector Roads
These routes provide service to the larger towns not directly served by the higher systems and to other traffic generators of equivalent intracounty importance, such as consolidated schools, shipping points, county parks, significant mining and agricultural areas, etc. Major collector roads also link these places to routes of higher classification and serve the more important intracounty travel corridors.

Minor Collector Roads
These collect traffic form local roads and bring all developed areas within a reasonable distance of a major collector road. They also provide service to the remaining smaller communities and link the locally important traffic generators with the rural outskirts.

Rural Local Road System

The local roads are all roads that are not on a higher system. Local residential subdivision streets and residential collector streets are elements of the local road system. Local residential streets are either cul-de-sacs, loop streets less than 2,500 feet (762.2 m) in length, or streets less than one mile (1.6 km) in length. They do not connect thoroughfares or serve major traffic generators and do not collect traffic form more than one hundred dwelling units. Residential collectors serve as the connecting street system between local residential streets and the thoroughfare system.

Figure A-1 gives a schematic illustration of a functionally classified rural highway system. The functional classification for Granville County is shown in Figure A-2.

Objectives of Thoroughfare Planning

Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet existing and future travel desires within the urban area. The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and it helps eliminate unnecessary improvements, so needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring a minimum amount of land for street purposes. In addition to providing for traffic needs the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population, commercial and industrial development affect major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

* To provide for the orderly development of an adequate major street system as land development occurs;

* To reduce travel and transportation costs;

* To reduce the cost of major street improvements to the public through the coordination of the street system with private action;

* To enable private interests to plan their actions, improvements, and development with full knowledge of public intent;

* To minimize disruption and displacement of people and businesses through long range advance planning for major street improvements;

* To reduce environmental impacts, such as air pollution, resulting from transportation, and

* To increase travel safety.

These objectives are achieved through improving both the operational efficiency of thoroughfares, and improving the system efficiency through system coordination and layout.

Operational Efficiency

A street's operational efficiency is improved by increasing the capability of the street to carry more vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined by the maximum number of vehicles which can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

Physical ways to improve vehicular capacity include:

* **Street widening** - widening of a street from two to four lanes more than doubles the capacity of the street by providing additional maneuverability for traffic.

* **Intersection improvements** - increasing the turning radii, adding exclusive turn lanes, and channelizing movements can improve the capacity of an existing intersection.

* **Improving vertical and horizontal alignment** - reduces the congestion caused by slow moving vehicles.

* **Eliminating roadside obstacles** - reduces side friction and improves a driver's field of sight.

Operational ways to improve street capacity include:

* **Control of Access** - a roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with identical lane width and number.

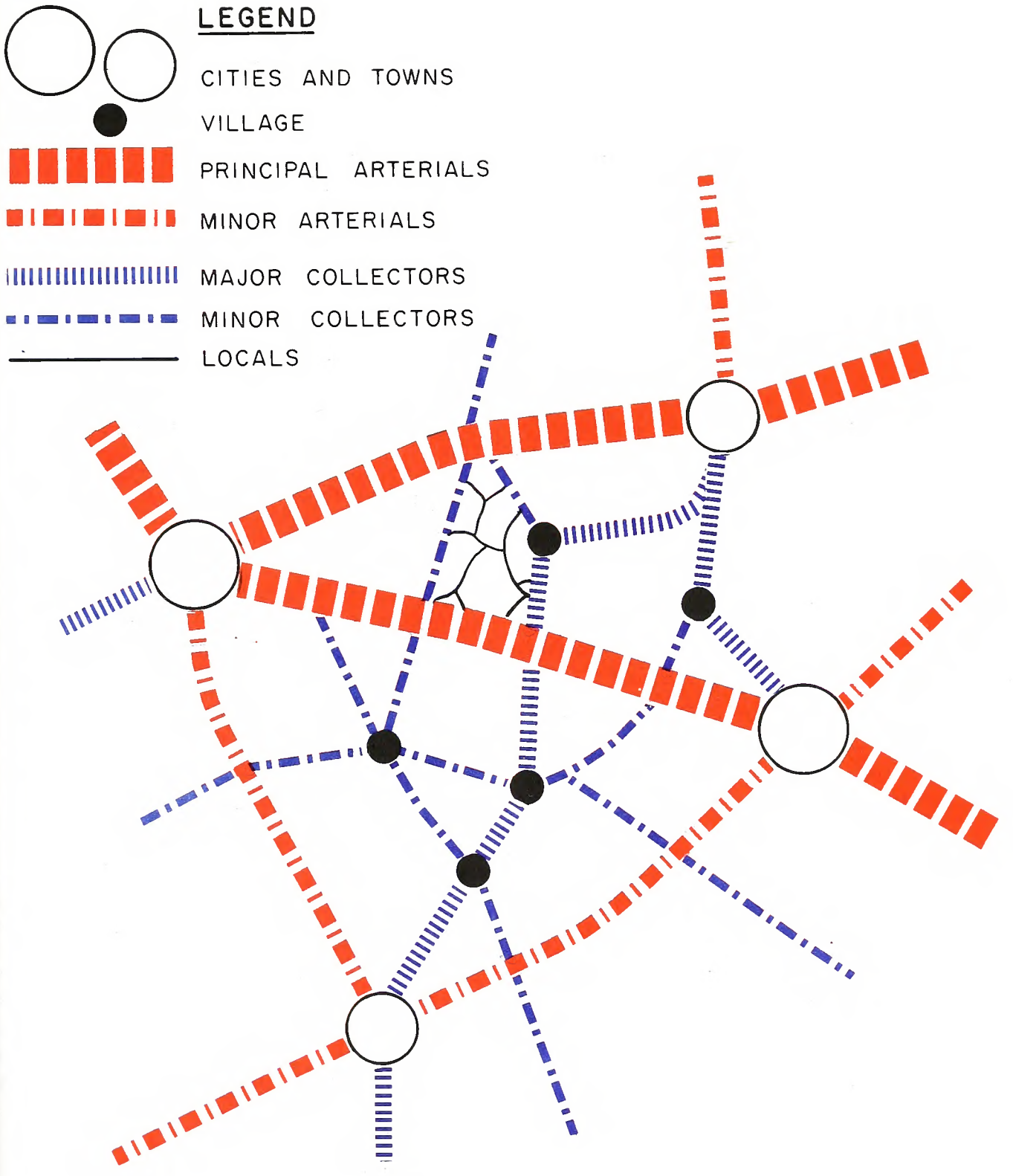
* **Parking removal** - Increases capacity by providing additional street width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.

* **One-way operation** - The capacity of a street can sometimes be increased 20 -50%, depending upon turning movements and overall street width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.

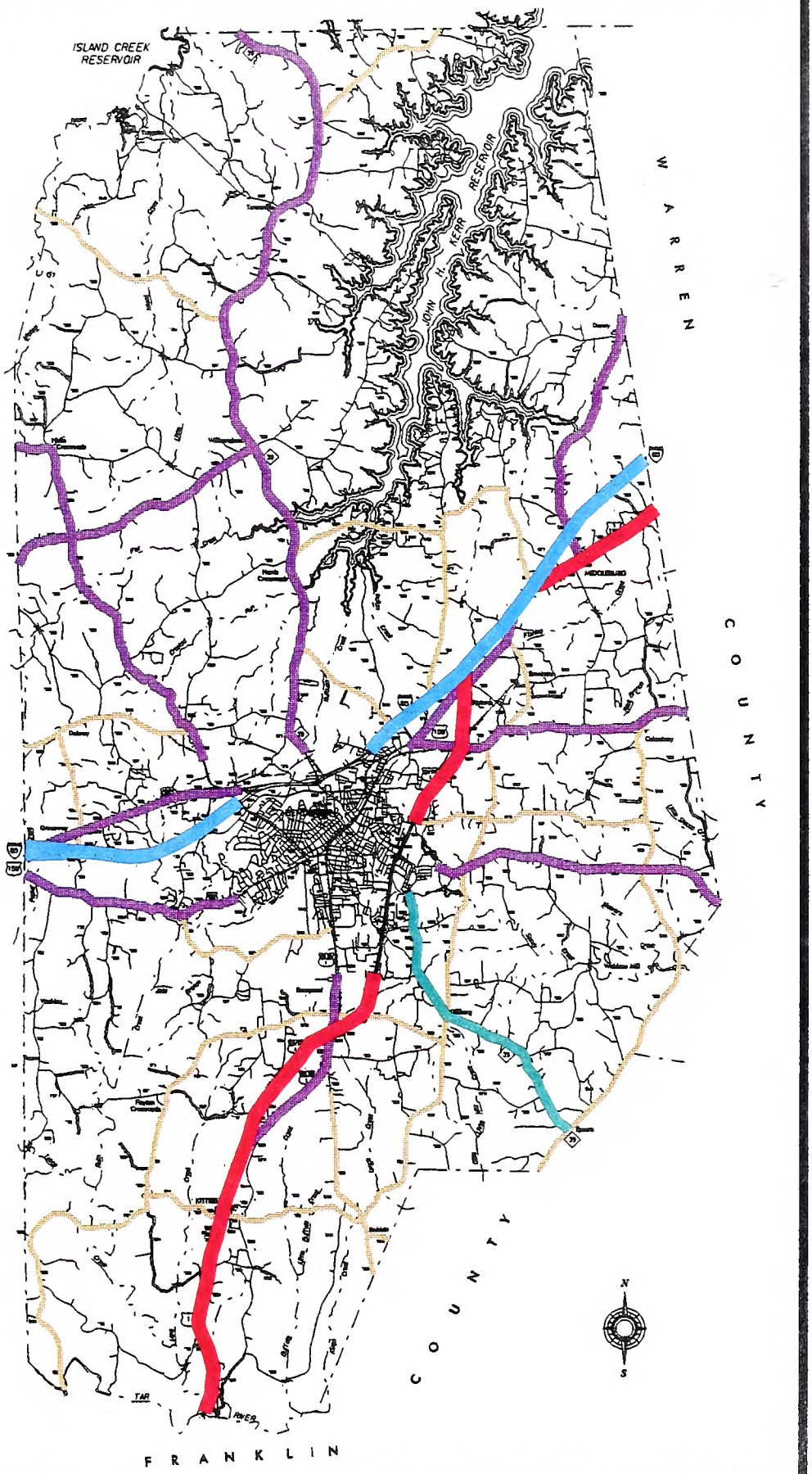
* **Reversible lane** - Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.

* **Signal phasing and coordination** - Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

FIGURE A-1



SCHEMATIC ILLUSTRATION
OF FUNCTIONALLY CLASSIFIED
RURAL HIGHWAY NETWORK



Functional Classification

- Interstate
- Other Principal Arterials
- Minor Arterials
- Major Collectors
- Minor Collectors

FIGURE A-2

Vance County
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT
IN COOPERATION WITH THE
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

1 0 1 2 3 4
miles

1 0 1 2 3 4 5
kilometers

Altering travel demand is a third way to improve the efficiency of existing streets. Travel demand can be reduced or altered in the following ways:

* **Carpools** - Encourage people to form carpools and vanpools for journeys to work and other trip purposes. This reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.

* **Alternate mode** - Encourage the use of transit and bicycle modes.

* **Work hours** - Encourage industries, businesses, and institutions to stagger work hours or establish variable work hours for employees. This will spread peak travel over a longer time period and thus reduce peak hour demand.

* **Land use** - Plan and encourage land use development or redevelopment in a more travel efficient manner.

System Efficiency

Another means for altering travel demand is the development of a more efficient system of streets that will better serve travel desires. A more efficient system can reduce travel distances, time, and cost to the user. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, system efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice thoroughfare planning is done for established urban area and is constrained by existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these and the many other factors that affect major street locations.

Through the thoroughfare planning process it is necessary from a practical viewpoint that certain basic principles be followed as closely as possible. These principles are listed below:

1. The plan should be derived from a thorough knowledge of today's travel - its component parts, and the factors that contribute to it, limit it, and modify it.

2. Traffic demands must be sufficient to warrant the designation and development of each major street. The thoroughfare plan should be designed to accommodate a large portion of major traffic movements on a few streets.

3. The plan should conform to and provide for the land development plan for the area.

4. Certain considerations must be given to urban development beyond the current planning period. Particularly in outlying or sparsely developed areas that have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect rights-of-way for future thoroughfare development.

5. While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible.

Appendix B

Thoroughfare Plan Street Tabulation and Recommendations

This appendix includes a detailed tabulation of all streets identified as elements of the Vance County Thoroughfare Plan. The table includes a description of each section, as well as the length, cross section, and right-of-way for each section. Also included are existing and projected average daily traffic volumes, roadway capacity, and the recommended ultimate lane configuration. Due to space constraints, these recommended cross sections are given in the form of an alphabetic code. A detailed description of each of these codes and a illustrative figure for each can be found in Appendix C.

The following index of terms may be helpful in interpreting the table:

NPAB - North Henderson Urban Planning Area Boundary

SPAB - South Henderson Urban Planning Area Boundary

EPAB - East Henderson Urban Planning Area Boundary

WPAB - West Henderson Urban Planning Area Boundary

VASL - Virginia State Line

ADQ - Adequate

Co. - County

N/A - Not Available

Figure B-1

ROADWAY	EXISTING CROSS SECTION			DESIGN CAPACITY				Italicized from Hend. model	(*corr. to HTP) RECOMMENDED CROSS SECTION	
SECTION	DIST MI	RDWY FT	ROW FT	LOS B	LOS C	LOS D	1995 ADT	2025 ADT	RDWY	LETTER
I-85										
US 158 - WPAB	3.17	48	340	30,700	47,300	58,400	26,900	*61,000*		ADQ
WPAB - US 1	1.70	48	160	30,700	47,300	58,400	19,900	*46,000*		ADQ
US 1 - WMCL	2.65	48	160	30,700	47,300	58,400	24,700	*59,000*		ADQ
US 1										
WMCL - WCL	2.68	22	100	2,000	3,750	5,700	5,500	*7,900*	24	K
SKCL - US 1B	4.96	48	90	33,600	46,700	55,700	7,900	*17,000*		ADQ
SR 1371 - WMCL	2.12	22	100	2,000	3,750	5,700	6,500	*7,800*	24	K
NC 39										
FCL - SPAB	3.15	24	60	2,100	3,900	5,900	4,800	*15,600*	48	G*
NC 39										
NPAB - SR 1308	3.82	22	60	2,000	3,750	5,700	4,800	6,500	24	K
SR 1308 - SR 1348	7.31	20	60	1,800	3,400	5,200	4,300	6,000	24	K
SR 1348 - VASL	4.65	20	60	1,650	3,100	4,800	2,200	3,000	24	K
SR 1329										
GCL - NC 39	5.20	18	NA	1,400	2,620	3,400	900	1,200		ADQ
SR 1303										
NPAB - GCL	6.30	18	NA	1,500	2,750	4,200	600	*1,900*	24	K*
SR 1369										
SR 1366 - US 1/158	4.83	18/24	60/100	1,820	3,420	5,200	1,100	1,800	24	K
SR 1001										
EPAB - WCL	1.80	20	100	1,700	3,200	4,900	3,200	*11,400*	24	K*
SR 1533										
EPAB - WCL	4.79	18	NA	1,500	2,800	4,350	2,400	*10,000*	24	K*
BUS 1										
US 1 - SPAB	2.00		NA	2,000	3,750	5,700	2,600	*7,600*	60	C*
SR 1342										
GCL - NC 39	4.40	18	NA	1,450	2,700	4,150	800	1,100	24	K
SR 1356										
VASL - NC 39	3.18	18	60	1,450	2,700	4,150	750	1,000		ADQ
SR 1308										
NC 39 - SR 1319	3.06	18	NA	1,450	2,700	4,150	460	1,000	24	K
SR 1374										
SR 1319 - SR 1371	1.40	20	NA	1,700	3,200	4,900	450	950	24	K
SR 1371										
SR 1374 - I 85	2.40	18	NA	1,450	2,700	4,900	650	1,000	24	K
SR 1319										
NPAB - SR 1374	4.20	24	NA	2,200	4,200	6,400	2,300	4,900		ADQ
SR 1304										
WPAB - GCL	3.60	18	NA	1,450	2,700	4,200	700	1,100	24	K*
SR 1515										
SR 1513 - SR 1533	2.20	20	NA	1,600	2,900	4,500	900	1,900		ADQ
SR 1523										
SR 1533 - FCL	5.70	18	NA	1,500	2,850	4,350	550	1,000		ADQ
SR 1518						(Henderson Plan leaves 20' width as ADQ)				
SR 1515 - EPAB	2.60	18	NA	1,450	2,700	4,150	900	*2,000*	24	K
SR 1519										
SPAB - LYNCH CRK	5.20	18	NA	1,500	2,900	4,350	1,300	*1,600*	24	K*
LYNCH CRK - SR 154	0.60	18	NA	1,500	2,900	4,350	450	900	24	K*
SR 1549										
SPAB - FCL	4.30	18	NA	1,500	2,900	4,350	870	*5,200*	24	K
SR 1550										
SR 1549 - FCL	0.49	18	NA	1,500	2,900	4,350	800	1,800		ADQ
SR 1551										
US 1 - SR 1549	2.84	18	NA	1,900	3,600	5,400	900	1,000		ADQ
SR 1101										
SR 1103 - SPAB	9.20	18	NA	1,500	2,900	4,350	1,100	*2,850*		ADQ
NEW SERVICE ROAD										
SR 1128 - SR 1128	2.20		90					*3,000*	24	K

EPAB - east planning area boundary
FCL - Franklin County Line
GCL - Granville County line
NPAB - north planning area boundary
SKCL - south Kittrell city limits
SPAB - south planning area boundary
VASL - Virginia state line
WCL - Warren County line
WMCL - west Middleburg city limits
WPAB - west planning area boundary
NA- Not Available
* - Cross Section Recommend in Henderson Plan

Appendix C

Typical Cross Sections

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each street section must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way. Typical cross section recommendations are shown in Figure C-1. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

The recommended typical cross sections shown in Appendix B, Table B-1 were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way.

On all existing and proposed major thoroughfares delineated on the thoroughfare plan, adequate right-of-way should be protected or acquired for the ultimate cross sections. Ultimate desirable cross sections for each of the thoroughfares are listed in Appendix B. Recommendations for "ultimate" cross sections are provided for the following:

1. thoroughfares which may require widening after the current planning period
2. thoroughfares which are borderline adequate and accelerated traffic growth could render them deficient
3. thoroughfares where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.

Recommended design standards relating to grades, sight distances, degree of curve, super elevation, and other considerations for thoroughfares are given in Appendix D.

A - Four Lanes Divided with Median - Freeway

Typical for four lane divided highways in rural areas which may have only partial or no control of access. The minimum median width for this cross section is 14 m (46 feet), but a wider median is desirable.

B - Seven Lanes - Curb & Gutter

This cross section is not recommended for new projects. When the conditions warrant six lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as when widening from a five lane section and right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "D" is the final cross section.

C - Five Lanes - Curb & Gutter

Typical for major thoroughfares, this cross section is desirable where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

D - Six Lanes Divided with Raised Median - Curb & Gutter/ E - Four Lanes Divided with Raised Median - Curb and Gutter

These cross sections are typically used on major thoroughfares where left turns and intersection streets are not as frequent. Left turns would be restricted to a few selected intersections. The 4.8 m (16 ft) median is the minimum recommended for an urban boulevard type cross section. most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In special cases, grassed or landscaped medians result in greatly increased maintenance costs and an increase danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

F - Four Lanes Divided - Boulevard, Grass Median

Recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 7.3 m (24 ft) is recommended with 9.1 m (30 ft) being desirable.

G - Four Lanes - Curb & Gutter

This cross section is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections. This cross section should be used only if the above criteria is met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

H - Three Lanes - Curb & Gutter

In urban environments, thoroughfares which are proposed to function as one-way traffic carriers would typically require cross section "H".

I - Two Lanes - C&G, Parking both sides: J - Two Lanes - C&G, Parking one side

Cross section "I" and "J" are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "I" would be used on those minor thoroughfares where parking on both sides is needed as a result of more intense development.

K - Two Lanes - Paved Shoulder

This cross section is used in rural areas or for staged construction of a wider multi-lane cross section. On some thoroughfares, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time. For areas that are growing and future widening will be necessary, the full right-of-way of 30 m (100 ft) should be required. In some instances, local ordinances may not allow the full 30 m. In those cases, 21 m (70 ft) should be preserved with the understanding that the full 30 m will be preserved by use of building setbacks and future street line ordinances.

L - Six Lanes Divided with Grass Median - Freeway

Cross section "L" is typical for controlled access freeways. The 14 m (46 ft) grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Right-of-way requirements would typically vary upward from 70 m (228 ft) depending upon cut and fill requirements.

M - Eight Lanes Divided with Raised Median - Curb & Gutter

Also used for controlled access freeways, this cross section may be recommended for freeways going through major urban areas or for routes projected to carry very high volumes of traffic.

N - Five Lanes/C&G, Widened Curb Lanes; O - Two Lane/Shoulder Section; P - Four Lanes Divided/Raised Median, C&G, Widened Curb Lanes

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities. Cross sections "N", "O", and "P" are typically used to accommodate bicycle travel.

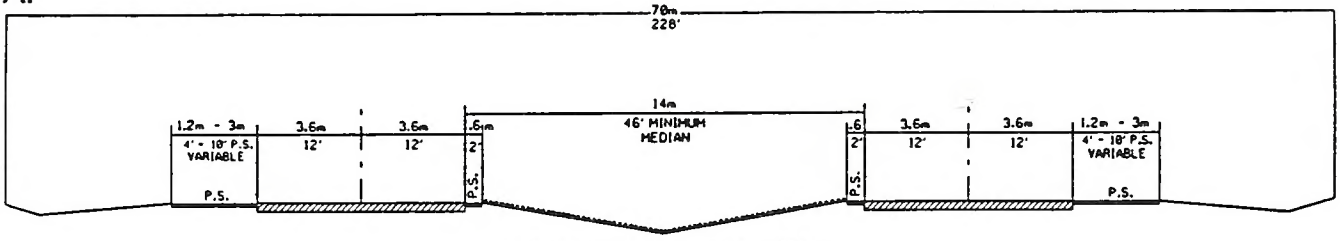
General

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk farther away from the street to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

The right-of-ways shown for the typical cross sections are the minimum right-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

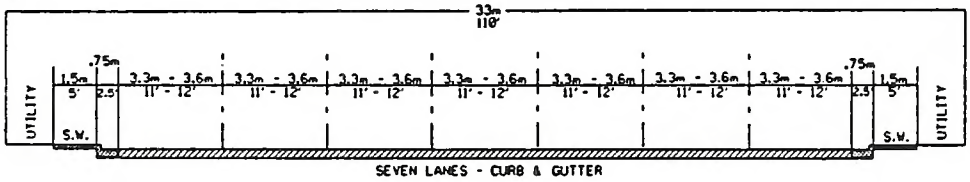
TYPICAL THOROUGHFARE CROSS SECTIONS

A.



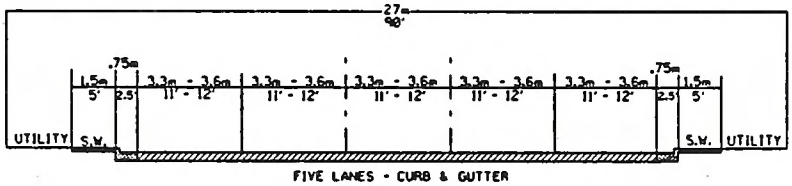
FOUR LANES DIVIDED WITH MEDIAN - FREEWAY

B.



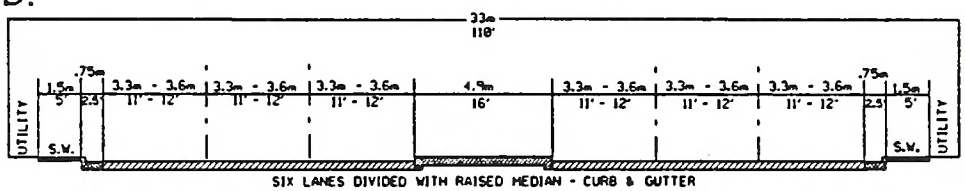
SEVEN LANES - CURB & GUTTER

C.



FIVE LANES - CURB & GUTTER

D.

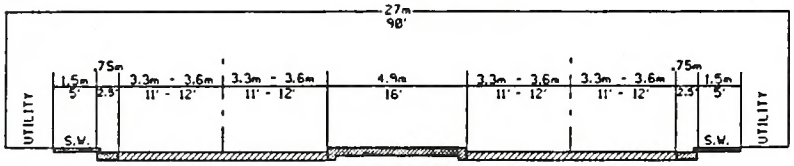


SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

FIGURE C-1

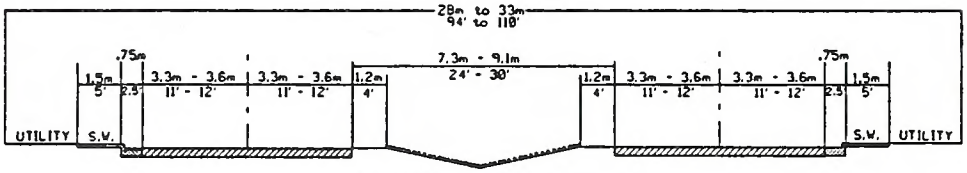
TYPICAL THOROUGHFARE CROSS SECTIONS

E.



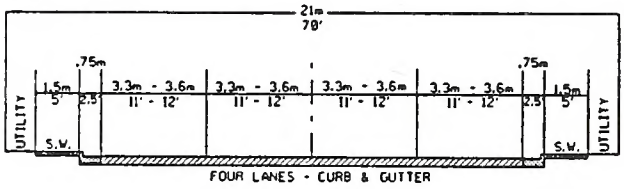
FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

F.



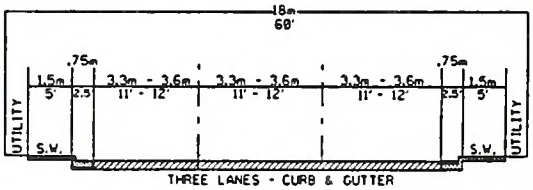
FOUR LANES DIVIDED - BOULEVARD
GRASS MEDIAN

G.



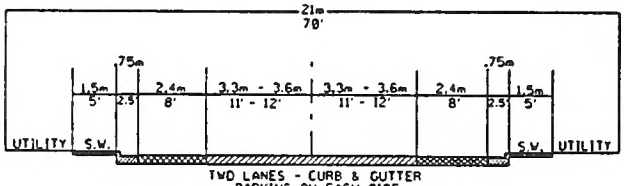
FOUR LANES - CURB & GUTTER

H.



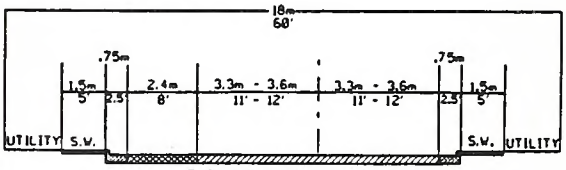
THREE LANES - CURB & GUTTER

I.



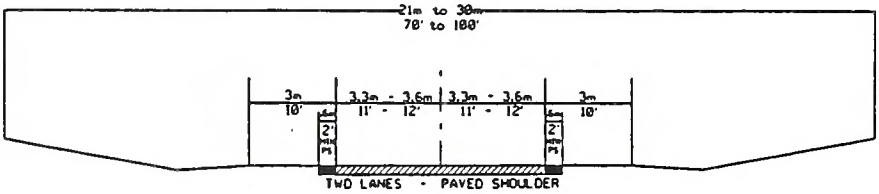
TWO LANES - CURB & GUTTER
PARKING ON EACH SIDE

J.



TWO LANES - CURB & GUTTER
PARKING ON ONE SIDE

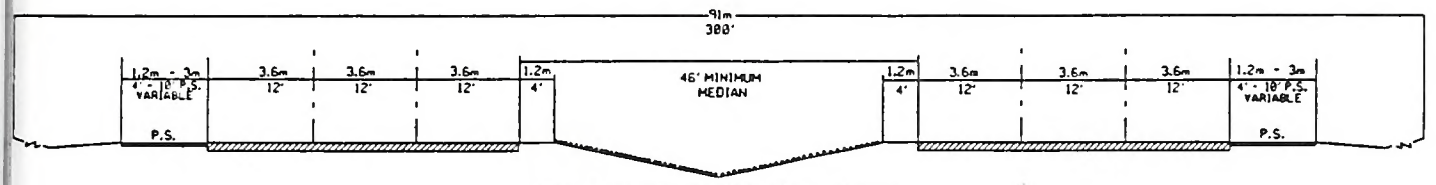
K.



TWO LANES - PAVED SHOULDER

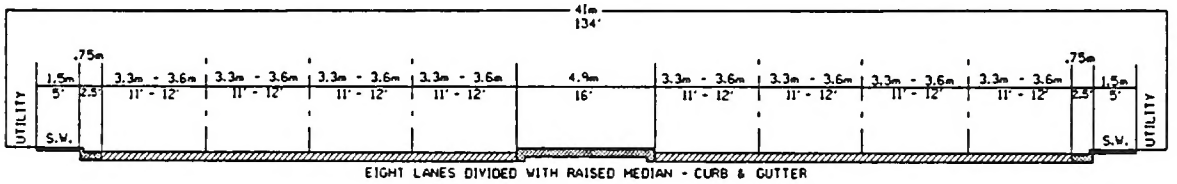
TYPICAL THOROUGHFARE CROSS SECTIONS

L.



SIX LANES DIVIDED WITH GRASS MEDIAN - FREEWAY

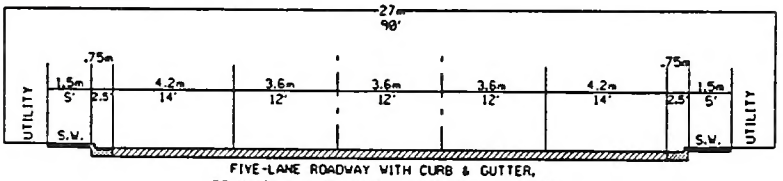
M.



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

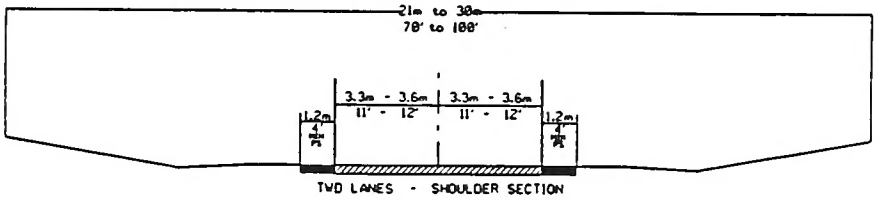
TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

N.



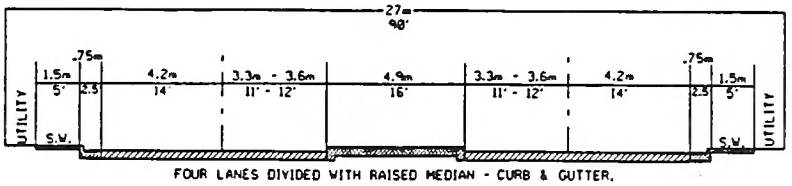
FIVE-LANE ROADWAY WITH CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES

O.



TWO LANES - SHOULDER SECTION

P.



FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES

Appendix D

Recommended Subdivision Ordinances

Definitions

Streets and Roads

Rural Roads

1. *Principal Arterial* - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.

2. *Minor Arterial* - A rural roadway joining cities and larger towns and providing intra-state and inter-county service at relatively high overall travel speeds with minimum interference to through movement.

3. *Major Collector* - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.

4. *Minor Collector* - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.

5. *Local Road* - A road which serves primarily to provide access to adjacent land, over relatively short distances.

Urban Streets

1. *Major Thoroughfares* - Major thoroughfares consist of Inter-state, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.

2. *Minor Thoroughfares* - Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through traffic movements and may also serve abutting property.

3. *Local Street* - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

Specific Type Rural or Urban Streets

1. *Freeway, expressway, or parkway* - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A *freeway* provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An *expressway* is a facility with full or partial control of access and generally with grade separations at major intersections. A *parkway* is for non-commercial traffic, with full or partial control of access.

2. *Residential Collector Street* - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.

3. *Local Residential Street* - Cul-de-sacs, loop streets less than 760 meters (2500 ft) in length, or streets less than 1.6 kilometers (1.0 miles) in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.

4. *Cul-de-sac* - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.

5. *Frontage Road* - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.

6. *Alley* - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

Property

Building Setback Line

A line parallel to the street in front of which no structure shall be erected.

Easement

A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

Lot

A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

Subdivision

Subdivider

Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

Subdivision

All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets.

The following shall not be included within this definition nor subject to these regulations.

* The combination or re-combination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein
* the division of land into parcels greater then 4 hectares (10 acres) where no street right-of-way dedication is involved

* the public acquisition, by purchase, of strips of land for the widening or the opening of streets

* the division of a tract in single ownership whose entire area is no greater than 0.8 hectares (2 acres) into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

Dedication

A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.

Reservation

Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

Design Standards

Streets and Roads

The design of all roads within the Planning Area shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan, as adopted by the municipality. The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

Right-of-way Widths

Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where (ROW) requirements have been specifically set out in the Thoroughfare Plan.

The subdivider will only be required to dedicate a maximum of 30 meters (100 ft) of right-of-way. In cases where over 30 meters (100 ft) of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 30 meters (100 ft). On all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less then 18 meters (60 ft) in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is sub-divided, the remainder of the full required right-of-way shall be dedicated.

Table D-1

Minimum Right-of-way Requirements

Area Classification	Functional Classification	Minimum ROW
RURAL	Principle Arterial	Freeways- 105 m (350 ft) Other- 60 m (200 ft)
	Minor Arterial	30 m (100 ft)
	Major Collector	30 m (100 ft)
	Minor Collector	24 m (80 ft)
	Local Road	18 m[1] (60 ft)
URBAN	Major Thoroughfare	27 m (90 ft)
	Minor Thoroughfare	21 m (70 ft)
	Local Street	18 m[1] (60 ft)
	Cul-de-sac	variable[2]

[1]The desirable minimum right-of-way (ROW) is 18 meters (60 ft). If curb and gutter is provided, 15 meters (50 ft) of ROW is adequate on local residential streets.

[2]The ROW dimension will depend on radius used for vehicular turn around. Distance from edge of pavement of turn around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn around.

Street Widths

Widths for street and road classifications other than local shall be as recommended by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. *Local Residential*

    * Curb and Gutter section
        * 7.8 meters (26 ft), face to face curb
    * Shoulder section
        * 6.0 meters (20 ft) to edge of pavement, 1.2 meters (4 ft) for shoulders

2. Residential Collector

    * Curb and Gutter section
        * 10.2 meters (34 ft), face to face of curb
    * Shoulder section
        * 6.0 meters (20 ft) to edge of pavement, 1.8 meters (6 ft) for shoulders

Geometric Characteristics

The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-way shall apply.

1. *Design Speed* - The design speed for a roadway should be a minimum of 10 km/h (5 mph) greater than the posted speed limit. The design speeds for subdivision type streets are shown in Tables D-2 (metric) and D-3 (english).

2. *Minimum Sight Distance* - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provide and calculated using the parameters set forth in Tables D-4 (metric) and D-5 (english).

3. *Superelevation* - Tables D-6 (metric) and D-7 (english) show the minimum radius and the related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

4. *Maximum and Minimum Grades*

    * the maximum grades in percent are shown in Table D-8 (metric) and D-9 (english)
    * minimum grade should not be less then 0.5%
    * grades for 30 meters (100 ft) each way from intersections (measured from edge of pavement) should not exceed 5%

Table D-2

Design Speeds (Metric)

Facility Type	Design Speed (km/h) Desirable	Minimum Level	Minimum Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	100	80	60
Local Roads[1] (ADT Over 400)	80	80	60
URBAN			
Major Thoroughfares[2]	100	60	60
Minor Thoroughfares	100	50	50
Local Streets	50	50	30

[1]Local Roads including Residential Collectors and Local Residential.

[2]Major Thoroughfares other than Freeways or Expressways.

Table D-3

Design Speeds (English)

Facility Type	Design Speed (mph) Desirable	Minimum Level	Minimum Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	60	50	40
Local Roads[1] (ADT Over 400)	50	*50	*40
URBAN			
Major Thoroughfares[2]	60	50	40
Minor Thoroughfares	40	30	30
Local Streets	30	**30	**20

Note: *Based on ADT of 400-750. Where roads serve a limited area and small number of units, can reduce minimum design speed. **Based on projected ADT of 50-250. (Reference NCDOT Roadway Design Manual page 1-1B)

[1]Local Roads including Residential Collectors and Local Residential.

[2]Major Thoroughfares other than Freeways or Expressways.

Table D-4

Sight Distance (Metric)

Design Speed (km/h)	Stopping Sight Distance (meters) Desirable	Minimum	Minimum K[1] Values (meters) Crest Curve	Sag Curve	Passing Sight Distance (meters) For 2-lanes
30	30	29.6	3	4	*
50	70	57.4	9	11	*
60	90	74.3	14	15	*
90	170	131.2	43	30	*
100	210	157.0	62	37	*

Note: General practice calls for vertical curves to be multiples of 10 meters. Calculated lengths shall be rounded up in each case. *Minimum passing distance for 2-lanes is currently under revision. (Reference NCDOT Roadway Metric Design Manual page 1-12 T-1)

[1]K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve which will provide the desired sight distance. Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1990".

Table D-5

Sight Distance (English)

Design Speed (mph)	Stopping Sight Distance (feet)		Minimum K[1] Values (feet)		Passing Sight Distance (feet)
	Desirable	Minimum	Crest Curve	Sag Curve	For 2-lanes
30	200	200	30	40	1100
40	325	275	60	60	1500
50	475	400	110	90	1800
60	650	525	190	120	2100

Note: General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case. (Reference NCDOT Roadway Design Manual page 1-12 T-1)

[1]K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve which will provide the desired sight distance. Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1990".

Table D-6

Superelevation Table (Metric)

Design Speed	Minimum Radius of Maximum e[1]		
	e=0.04	e=0.06	e=0.08
50	100	90	80
65	175	160	145
80	280	250	230
100	490	435	395

[1]e = rate of roadway superelevation, meter per meter.

Table D-7

Superelevation Table (English)

Design Speed (mph)	Minimum Radius of Maximum e[1]			Maximum Degree of Curve		
	e=0.04	e=0.06	e=0.08	e=0.04	e=0.06	e=0.08
30	302	273	260	19 00'	21 00'	22 45'
60	573	521	477	10 00'	11 15'	12 15'
80	955	955	819	6 00'	6 45'	7 30'
100	1,637	1,432	1,146	3 45'	4 15'	4 45'

[1]e = rate of roadway superelevation, foot per foot

Note: (Reference NCDOT Roadway Design Manual page 1-12 T-6 thru T-8)

Table D-8

Maximum Vertical Grade (Metric)

Facility Type and Design Speed (km/h)	Minimum Grade in Percent		
	Flat	Rolling	Mountainous
RURAL			
Minor Collector Roads*			
30	7	10	12
50	7	9	10
65	7	8	10
80	6	7	9
100	5	6	8
110	4	5	6
Local Roads*[1]			
30	-	11	16
50	7	10	14
65	7	9	12
80	6	8	10
100	5	6	-
URBAN			
Major Thoroughfares[2]			
50	8	9	11
65	7	8	10
80	6	7	9
100	5	6	8
Minor Thoroughfares*			
30	9	12	14
50	9	11	12
65	9	10	12
80	7	8	10
100	6	7	9
110	5	6	7
Local Streets*			
30	-	11	16
50	7	10	14
65	7	9	12
80	6	8	10
100	5	6	-

Note: *For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table. (Reference NCDOT Roadway Metric Design Manual page 1-12 T-3)

[1]Local Roads including Residential Collectors and Local Residential.

[2]Major Thoroughfares other than Freeways or Expressways.

Table D-9

Maximum Vertical Grade (English)

Facility Type and Design Speed (km/h)	Minimum Grade in Percent		
	Flat	Rolling	Mountainous
RURAL			
Minor Collector Roads*			
20	7	10	12
30	7	9	10
40	7	8	10
50	6	7	9
60	5	6	8
70	4	5	6
Local Roads*[1]			
20	-	11	16
30	7	10	14
40	7	9	12
50	6	8	10
60	5	6	-
URBAN			
Major Thoroughfares[2]			
30	8	9	11
40	7	8	10
50	6	7	9
60	5	6	8
Minor Thoroughfares*			
20	9	12	14
30	9	11	12
40	9	10	12
50	7	8	10
60	6	7	9
70	5	6	7
Local Streets*			
20	-	11	16
30	7	10	14
40	7	9	12
50	6	8	10
60	5	6	-

Note: *For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table. (Reference NCDOT Roadway Metric Design Manual page 1-12 T-3)

[1]Local Roads including Residential Collectors and Local Residential.

[2]Major Thoroughfares other than Freeways or Expressways.

Intersections

1. Streets shall be laid out so as to interest as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees.

2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.

3. Off-set intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 60 meters (200 ft) between survey centerlines.

Cul-de-sacs

Cul-de-sacs shall not be more than one hundred and fifty (150) meters (500 ft) in length. The distance from the edge of pavement on the vehicular turn around to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provisions are mode for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least 6.0 meters (20 ft).

3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn around facilities at the dead-end as may be required by the Planning Board.

Permits for Connection to State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 9.0 meters (30 ft) form the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 1.8 meters (6 ft) from the face of curb.

Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

    * shoulder section approach

        * under 800 ADT design year - minimum 8.4 meters (28 ft) width face to face of parapets, rails, or pavement width plus 3 meters (10 ft), whichever is greater.

        * 800 - 2000 ADT design year - minimum 10.2 meters (34 ft) width face to face of parapets, rails, or pavement width plus 3.6 meters (12 ft), whichever is greater

        * over 2000 ADT design year - minimum width of 12 meters (40 ft), desirable width of 13.2 meters (44 ft) width face to face of parapets or rails

    * curb and gutter approach

        * under 800 ADT design year - minimum 7.2 meters (24 ft) face to face of curbs

        * over 800 ADT design year - with of approach pavement measured face to face of curbs.

    * where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be a minimum of 450 millimeters (1' 6"), or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

    * shoulder section approach - Width of approach pavement plus width of usable shoulders on the approach left and right. (shoulder width 2.4 m (8 ft) minimum, 3 m (10 ft) desirable.)

    * curb and gutter approach - Width of approach pavement measured face to face of curbs.

Appendix E

Index for Secondary Road Numbers

- SR 1001 - Warrenton Road
- SR 1101 - Belmont Drive
- SR 1101 - County Home Road
- SR 1101 - Lynnbank Road
- SR 1101 - Charlie Grissom Road
- SR 1101 - Grissom Road
- SR 1103 - Fairport Road
- SR 1105 - Kittrell College Road
- SR 1303 - Hicksboro Road
- SR 1304 - Dabney Road
- SR 1308 - Glebe Road
- SR 1308 - Nutbush Road
- SR 1319 - Satterwhite Point Road
- SR 1329 - Stagecoach Road
- SR 1329 - Thomas Road
- SR 1335 - Burnside Road
- SR 1336 - Stovall Road
- SR 1342 - Morgan Road
- SR 1356 - Rock Springs Church Road
- SR 1369 - Jackson Town Road
- SR 1371 - Fleming Town Road
- SR 1374 - Anderson Creek Road
- SR 1400 - Jackson Royster Road
- SR 1512 - Milton Stainback Road
- SR 1515 - S Cokesbury Road
- SR 1518 - Newton Dairy Road
- SR 1518 - Stewart Farm Road
- SR 1519 - Gillburg Road
- SR 1519 - Cary Chapel Road
- SR 1519 - Rock Mill Road
- SR 1523 - Southerland Mill
- SR 1523 - New Bethel Church Road
- SR 1523 - Epsom-Rocky Ford Road
- SR 1533 - Vicksboro Road
- SR 1549 - Bobbitt Road
- SR 1550 - Rocky Ford Road
- SR 1551 - Kittrell Road

Appendix F

Process for Placement of a Project in the Transportation Improvement Program

The process for attempting to get a project into the Transportation Improvement Program (TIP) is described briefly in this appendix.

The County Commissioners and Transportation Advisory Committee should decide on which projects they would like funded and placed in the TIP. They should not try and attempt to get all of the improvements recommended in the thoroughfare plan into the TIP but select carefully a few of the projects that would provide the greatest impact on the traffic network in the area. These projects should be prioritized by the planning board and summarized briefly, and shown on Appendix Page F-2.

After determining which projects are needed in the area then an official letter for the TIP Project Request should be written to the North Carolina Board of Transportation Member from the County's respective Division. Along with the letter, should be the prioritized summary of proposed projects for funding, a TIP Candidate Project Request Form for every project that is to be considered for funding and inclusion in the TIP, and a map that describes the location of each project that is being proposed for funding. An example of each one of there items is included in this appendix on the pages that follow.

CITY OF ROCKY MOUNT

OFFICE OF
THE CITY MANAGER

November 14, 1994

Mr. Clark Jenkins, Member
N.C. Board of Transportation
N.C. Department of Transportation
P.O. Box 25201
Raleigh, NC 27611-5201

RE: 1996-2002 TIP Project Requests
Rocky Mount Metropolitan Area

Dear Mr. Jenkins:

Enclosed find the projects requested by the Rocky Mount Metropolitan Area for consideration in the next TIP update. The list is presented by priority, as approved by the Rocky Mount Area Transportation Advisory Committee (TAC) on November 9, 1994.

The Transportation Advisory Committee also endorsed the existing schedule of projects contained in the current TIP for the Rocky Mount urban area, with one request. The TAC requests that TIP Project #U-2310 specifically include intersection improvements on the north side of the intersection of NC 97 (Raleigh Road) and Nashville Road. This intersection is very restricted and the TAC wants to ensure that improvements are considered as part of the widening project.

We thank you for the opportunity to participate in development of the state TIP. Please contact us immediately if additional information is needed concerning any of the enclosed project requests.

Sincerely,

Peter Varney

Peter F. Varney
Assistant City Manager

Enclosure

One Government Plaza • Post Office Box 1180 • Rocky Mount, North Carolina 27802-1180

ROCKY MOUNT METROPOLITAN AREA
TRANSPORTATION ADVISORY COMMITTEE

1994 PROPOSED HIGHWAY PROJECTS (FINAL)

3 301 Bypass from Benvenue Road to May Drive — NASH
on 1995-2001 TIP for feasibility (#U-3330)
Request project funding & schedule, and request
extension of project to north of Tiffany Blvd.
intersection

bbott Labs Road and SR 1400 improvements — EDGECOMBE & NASH
on 1995-2001 TIP for feasibility (#U-3329)
Request project funding and schedule

ountry Club Road from Jeffreys to US 64 — NASH
ON 1995-2001 TIP for feasibility (#U-3331)
Request project funding and schedule

unter Hill Road from Country Club Road to NC 43 — NASH
Major thoroughfare approaching capacity
Request widening to accommodate present &
future traffic

uter Loop: Southern Connector — EDGECOMBE & NASH
Request feasibility study to determine the best
location for rail, river & highway crossings
required to connect sections of the outer loop

alifax Road from Sunset to Bethlehem Road — NASH
On 1995-2001 TIP for feasibility (#U-3316)
Request project funding and schedule

uter Loop: US 301 to Old Battleboro Road — EDGECOMBE
Widen to accommodate traffic
Possible realignment east of US 301 to eliminate
offset at Fountain Correctional Center

effreys Road from Benvenue Road to US 301 Bypass — NASH
Widen to accommodate traffic
Minor thoroughfare approaching capacity on
segment between Fenner Road and US 301 Bypass

ashville Road/Bridge over Tar River — NASH
Stacking space insufficient for southbound traffic
turning left onto Hammond Street
Major thoroughfare

ethlehem Road from Beechwood Drive to Halifax Rd — NASH
Widen to accommodate future traffic from continuing
development in this area and west of Halifax Road
Thoroughfare plan designates as major thoroughfare

HIGHWAY PROGRAM
TIP CANDIDATE PROJECT REQUEST

(PLEASE PROVIDE INFORMATION IF AVAILABLE)

MPO Rocky Mount 2. DATE 11-14-94 3. PRIORITY NO. 1

ROUTE (US, NC, SR/Local Name) US 301 Bypass

PROJECT LOCATION (From/To/Length) NC 43/48 (Benvenue Rd) to Tiffany Boulevard (length revised from #u-3330 feasibility to include intersection at Tiffany Boulevard)

TYPE OF PROJECT (Widening, New Facility, Resurfacing, Bridge Replacement, Signing, Safety, Rail Crossing, etc.)
Widening

. EXISTING CROSS SECTION _____ FEET, TYPE _____

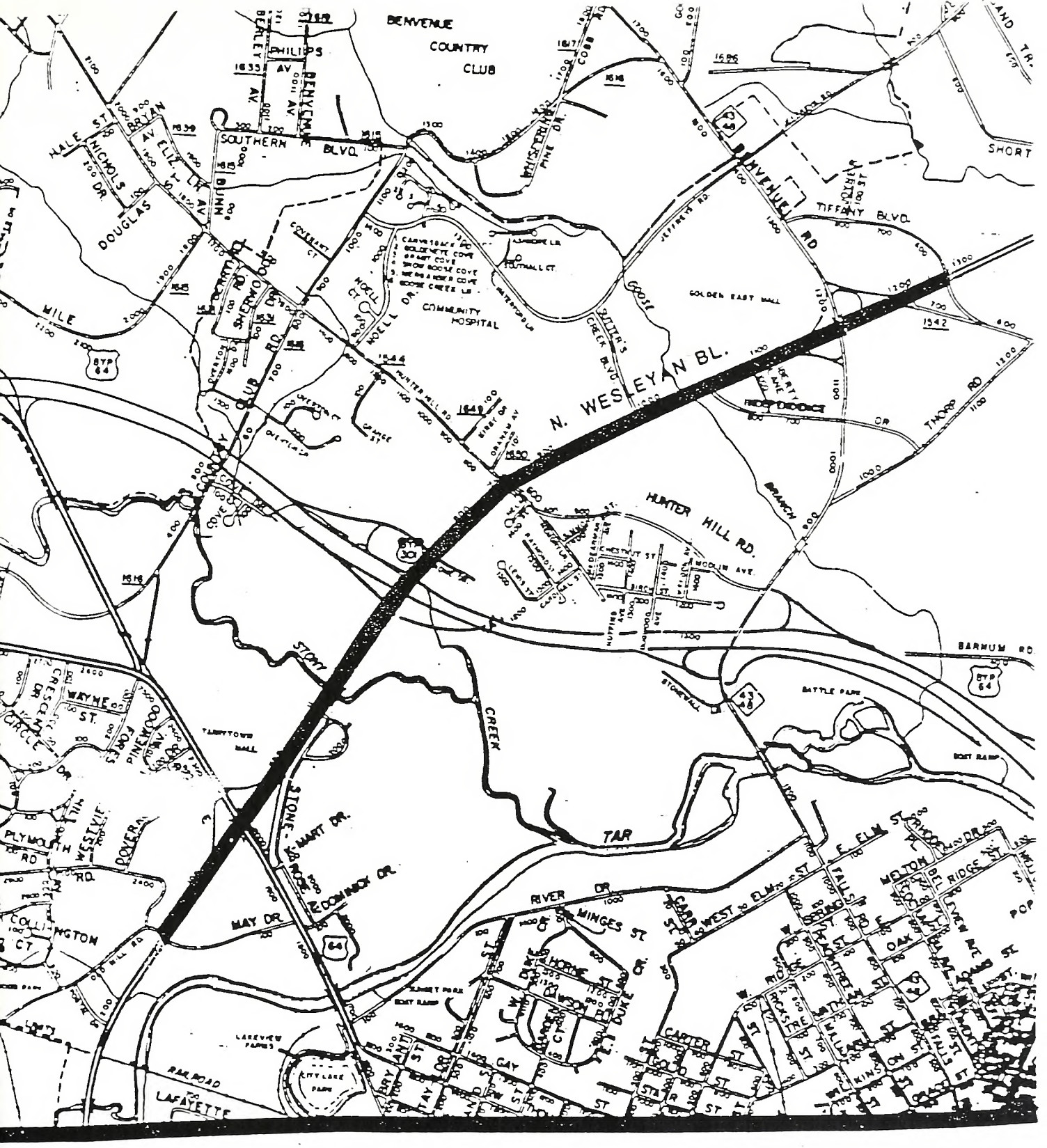
. EXISTING ROW _____ FEET 9. EXISTING ADT 29,386 (1992)

. ESTIMATED COST, ROW $ _____ CONSTRUCTION $ _____

. BRIEF JUSTIFICATION FOR PROJECT Major thoroughfare carrying increasing traffic from large commercial developments within this corridor and north-south through traffic. MPO requests funding & scheduling based on feasibility study results.

. PROJECT SUPPORTED BY (Agency/Group)
ROCKY MOUNT AREA TRANSPORATION ADVISORY COMMITTEE

PLEASE ATTACH MAP SHOWING PROJECT LOCATION



#1 US 301 BYPASS

Benvenue Rd (NC43/48) to May Drive

N